CHANGE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

7110.65M CHG 2

9/25/00

SUBJ: AIR TRAFFIC CONTROL

1. PURPOSE. This change transmits revised pages to Order 7110.65M, Air Traffic Control, and a Briefing Guide.

2. DISTRIBUTION. This change is distributed to select offices in Washington headquarters, regional offices, the FAA Technical Center, the FAA Aeronautical Center, all air traffic field facilities, international aviation field offices, and interested aviation public.

3. EFFECTIVE DATE. January 25, 2001.

4. EXPLANATION OF CHANGES. See the Explanation of Changes attachment which has editorial corrections and changes submitted through normal procedures. The Briefing Guide lists only new or modified material, along with background and operational impact statements.

5. DISPOSITION OF TRANSMITTAL. Retain this transmittal until superseded by a new basic order.

6. PAGE CONTROL CHART. See the Page Control Chart attachment.

~ SIGNED ~
Ronald E. Morgan
Director of Air Traffic

Date: 9/25/00

Distribution: ZAT-710

Initiated By: ATP-100

Air Traffic Control
Explanation of Changes

Direct questions through appropriate facility/region staff to the Office of Primary Interest (OPI)

a. 1-2-6. ABBREVIATIONS

Adds the following abbreviations to Table 1-2-1:
AMASS (Airport Movement Area Safety System)
ARTS (Automated Radar Tracking System)
ATTS (Automated Terminal Tracking Systems)
CPME (Calibration Performance Monitor Equipment)
CTRD (Certified Tower Radar Display)
EDCT (Expect Departure Clearance Time)
M-EARTS (Micro-En Route Automated Radar Tracking System)
RTQC (Real-Time Quality Control)
Also, modifies:
AMB (Ambiguity)
(ATP-120)

b. 2-1-5. EXPEDITIOUS COMPLIANCE

Adds wording to expand the explanation of the term "expedite" when used in conjunction with a climb or descent clearance. (ATP-110)

c. 2-1-10. NAVAID MALFUNCTIONS

Realigns GPS reporting requirements. (ATP-402)

d. 2-6-4. WEATHER AND CHAFF SERVICES

Standard Terminal Automation Replacement System (STARS) and ARTS Color Display (ACD) have increased functionality for display of up to six levels of weather. (ATP-120)

e. 2-9-2. OPERATING PROCEDURES

Makes editorial changes to eliminate the possibility of confusion. (ATP-120)

f. 2-9-3. CONTENT

Makes editorial changes to eliminate the possibility of confusion. (ATP-120)

g. 3-1-6. TRAFFIC INFORMATION

Adds new abbreviation CTRD. (ATP-120)

h. 3-6-1. EQUIPMENT USAGE

Clarifies the operational requirements and usage of Airport Surface Detection Equipment (ASDE)/Airport Movement Area Safety System (AMASS). (ATP-120)

i. 3-6-2. INFORMATION USAGE

Adds AMASS procedures for operational use. (ATP-120)

j. 3-6-3. IDENTIFICATION

Adds AMASS and clarifies the requirement for this use. (ATP-120)

k. 3-6-4. AMASS ALERT RESPONSES

Adds AMASS procedures for operational use. (ATP-120)

l. 3-7-5. PRECISION APPROACH CRITICAL AREA

Makes change to eliminate possible confusion. (ATP-120)

m. 3-9-4. TAXI INTO POSITION AND HOLD (TIPH)

Modifies the current requirements. The intent is to reduce the possibility of an aircraft landing over another aircraft holding in position. (ATP-120)

n. 3-9-7. WAKE TURBULENCE SEPARATION FOR INTERSECTION DEPARTURES

Clarifies the application of wake turbulence separation for departures on parallel runways separated by less than 2,500 feet with runway thresholds offset by 500 feet or more. (ATP-120)

o. 3-9-10. CANCELLATION OF TAKEOFF CLEARANCE

Makes editorial change. (ATP-120)

p. 3-10-7. LANDING CLEARANCE WITHOUT VISUAL OBSERVATION

Adds new abbreviation CTRD. (ATP-120)

q. 3-10-9. RUNWAY EXITING

Clarifies the need for controller awareness when aircraft exit the runway after landing. (ATP-110)

r. 4-3-9. FORWARDING DEPARTURE TIMES

Depending upon ATTS, DM will flash as appropriate in the full data block, although not necessarily in field 4. (ATP-120)

s. 4-5-7. ALTITUDE INFORMATION

Clarifies "descend via" in phraseology example. (ATP-110)

t. 4-6-4. HOLDING INSTRUCTIONS

Updates holding instructions. (ATP-402)

u. 4-7-11. ARRIVAL INFORMATION BY APPROACH CONTROL FACILITIES

Adds new abbreviations ATTS and CTRD. (ATP-120)

v. 5-1-2. ALIGNMENT CHECK

Clarifies alignment accuracy checks and changes title of paragraph to "ALIGNMENT ACCURACY CHECK." (ATP-120)

w. 5-1-3. RADAR USE

Some ATTS allow overlapping primary radar coverage from multiple radar sites. This change includes terminal and en route environments. (ATP-120)

x. 5-2-2. DISCRETE ENVIRONMENT

Adds new abbreviation ATTS. (ATP-120)

y. 5-2-13. CODE MONITOR

Adds STARS. (ATP-120)

z. 5-5-2. TARGET SEPARATION

Adds the word "digitized" to clarify digitized targets. (ATP-110)

aa. 5-5-3. MINIMA

Moves the current paragraph 5-5-3, Minima, to new paragraph 5-5-4, Minima, and establishes terminal minima for mosaic capabilities of the ATTS. Also, moves the Target Resolution procedures from the Pilot/Controller Glossary to new paragraph 5-5-3, Target Resolution. (ATP-120)

ab. 7-2-1. VISUAL SEPARATION

Clarifies the application of visual separation in a terminal area. (ATP-120)

ac. 7-4-3. CLEARANCE FOR VISUAL APPROACH

Modifies subparagraph b and the phraseology statement. (ATP-120)

ad. 8-5-4. SAME DIRECTION

Modifies Figure 8-5-3, Transitioning from Offshore to Oceanic Airspace; Same Direction, to show the correct separation minima of 5 minutes in trail and 4,000 feet vertical separation. (ATP-130)

ae. 9-4-2. SEPARATION MINIMA

Makes a minor editorial change. (ATP-200)

af. 9-4-3. VFR-ON-TOP

Corrects the procedures currently in subparagraph 9-4-3a and adds a reference note. (ATP-200)

ag. APPENDIX B. AIRCRAFT INFORMATION HELICOPTERS/ROTORCRAFTS

Corrects the weight class for Boeing and Kawasaki/H46, McDonnell-Douglas/H64, and Sikorsky/H60. (ATP-120)

ah. Changes all references to "Centerfield Wind" to "Airport Wind." (ATP-120)

ai. Changes were made updating references to other orders to reflect changes in paragraph numbers/titles. Revision bars were used. (ATA-10)

aj. Editorial/format changes were made where necessary. Revision bars were not used due to the insignificant nature of the changes. (ATA-10)

PAGE CONTROL CHART

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JANUARY 25, 2001

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Section 5. Route and NAVAID Description

Section 6. Weather Information

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Chapter 3. Airport Traffic Control– Terminal

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Chapter 5. Radar

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Section 8. Radar Departures

Section 9. Radar Arrivals

Section 10. Radar Approaches– Terminal

1-2-4. REFERENCES

As used in this order, references direct attention to an additional or supporting source of information such as FAA, NWS, and other agencies' orders, directives, notices, CFR's, and Advisory Circulars (AC's).

1-2-5. ANNOTATIONS

Revised, reprinted, or new pages are marked as follows:

a. The change number and the effective date are printed on each revised or additional page.

b. A page that does not require a change is reprinted in its original form.

c. Bold vertical lines in the margin of changed pages indicate the location of substantive revisions to the order. Bold vertical lines adjacent to the title of a chapter, section, or paragraph means that extensive changes have been made to that chapter, section, or paragraph.

d. Paragraphs/sections annotated with *EN ROUTE* or *TERMINAL* are only to be applied by the designated type facility. When they are not so designated, the paragraphs/sections apply to both types of facilities (en route and terminal).

e. The annotation, *USAF* for the U.S. Air Force, *USN* for the U.S. Navy, and *USA* for the U.S. Army denotes that the procedure immediately following the annotation applies only to the designated service.

REFERENCE-
FAAO 7110.65, Military Procedures, Para 2-1-12.

f. WAKE TURBULENCE APPLICATION inserted within a paragraph means that the remaining information in the paragraph requires the application of wake turbulence procedures.

g. The annotation ***PHRASEOLOGY*** denotes the prescribed words and/or phrases to be used in communications.

NOTE-
Controllers may, after first using the prescribed phraseology for a specific procedure, rephrase the message to ensure the content is understood. Good judgement shall be exercised when using nonstandard phraseology.

h. The annotation ***EXAMPLE*** provides a sample of the way the prescribed phraseology associated with the preceding paragraph(s) will be used. If the preceding paragraph(s) does (do) not include specific prescribed phraseology, the ***EXAMPLE*** merely denotes suggested words and/or phrases that may be used in communications.

NOTE-
The use of the exact text contained in an example not preceded with specific prescribed phraseology is not mandatory. However, the words and/or phrases are expected, to the extent practical, to approximate those used in the example.

1-2-6. ABBREVIATIONS

As used in this manual, the following abbreviations have the meanings indicated. (See TBL 1-2-1.)

FAA Order 7110.65 Abbreviations

Abbreviation	*Meaning*
AAR	Airport acceptance rate
AAT-1	Director of Air Traffic
AC	Advisory Circular
ACC	Area Control Center
ACLS	Automatic Carrier Landing System
ADC	Aerospace Defense Command
ADIZ	Air defense identification zone (to be pronounced "AY DIZ")
AIM	Aeronautical Information Manual
AIRMET	Airmen's meteorological information
ALERFA	Alert Phase code (Alerting Service)
ALNOT	Alert notice
ALS	Approach light system
ALTRV	Altitude reservation
AMASS	Airport Movement Area Safety System
AMB	Ambiguity-A disparity greater than 2 miles exists between the position declared for a target by ATTS and another facility's computer declared position during interfacility handoff
AMVER	Automated Mutual Assistance Vessel Rescue System
ANG	Air National Guard
ARINC	Aeronautical Radio Incorporated
ARIP	Air refueling initial point
ARS	Air Traffic System Requirements Service
ARSR	Air route surveillance radar
ARTCC	Air route traffic control center
ARTS	Automated Radar Tracking System
ASDE	Airport surface detection equipment
ASR	Airport surveillance radar
ATA	Air Traffic Airspace Management Program
ATC	Air traffic control
ATCAA	ATC assigned airspace
ATCSCC	Air Traffic Control System Command Center

Abbreviation	*Meaning*
ATIS	Automatic terminal information service
ATP	Air Traffic Planning and Procedures
ATS	Air Traffic Service
ATTS	Automated Terminal Tracking Systems
BASE	Cloud base
CARCAII	Chief, Aerial Reconnaissance Coordination, All Hurricanes
CARF	Central Altitude Reservation Function
CAT	Clear air turbulence
CDT	Controlled Departure Time
CENRAP	Center Radar ARTS Presentation
CEP	Central East Pacific
CERAP	Combined Center/RAPCON
CFR	Code of Federal Regulations
CNS	Continuous
CPME	Calibration Performance Monitor Equipment
CTA	Control Area
CTRD	Certified Tower Radar Display
CVFP	Charted Visual Flight Procedure
CWA	Center Weather Advisory
DARC	Direct Access Radar Channel
DETRESFA	Distress Phase code (Alerting Service)
DF	Direction finder
DH	Decision height
DME	Distance measuring equipment compatible with TACAN
DOE	Department of Energy
DP	Instrument Departure Procedure
DR	Dead Reckoning
DSR	Display System Replacement
DVFR	Defense Visual Flight Rules
ECM	Electronic countermeasure
EDARC	Enhanced Direct Access Radar Channel
EDCT	Expect Departure Clearance Time
EFC	Expect further clearance
ELT	Emergency locator transmitter
EOVM	Emergency obstruction video map
ETA	Estimated time of arrival
FAA	Federal Aviation Administration
FAAO	FAA Order
FDIO	Flight Data Input/Output
FIR	Flight Information Region
FL	Flight level
FLIP	Flight Information Publication
FLY	Fly or flying
FMS	Flight Management System
FMSP	Flight Management System Procedure
FSS	Flight Service Station
GCA	Ground controlled approach
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
HIRL	High intensity runway lights
ICAO	International Civil Aviation Organization
IDENT	Aircraft identification
IFR	Instrument flight rules
IFSS	International flight service station
ILS	Instrument Landing System
INCERFA	Uncertainty Phase code (Alerting Service)
INREQ	Information request
INS	Inertial Navigation System
IR	IFR military training route
JATO	Jet assisted takeoff
LAHSO	Land and Hold Short Operations
LLWAS	Low level wind shear alert system
L/MF	Low/medium frequency
LORAN	Long Range Navigation System
LTD	Along Track Distance
Mach	Mach Number
MALS	Medium intensity approach light system
MALSR	Medium approach light system with runway alignment indicator lights
MAP	Missed approach point
MARSA	Military authority assumes responsibility for separation of aircraft
MCA	Minimum crossing altitude
MCI	Mode C Intruder
MDA	Minimum descent altitude
MDM	Main Display Monitor
MEA	Minimum en route (IFR) altitude
M-EARTS	Micro-En Route Automated Radar Tracking System
MIA	Minimum IFR altitude
MIRL	Medium intensity runway lights
MLS	Microwave Landing System
MNPS	Minimum Navigation Performance Specification
MOA	Military operations area
MOCA	Minimum obstruction clearance altitude
MRA	Minimum reception altitude
MSAW	Minimum Safe Altitude Warning
MSL	Mean sea level
MTI	Moving target indicator
MTR	Military training route
MVA	Minimum vectoring altitude
NADIN	National Airspace Data Interchange Network
NAS	National Airspace System
NAT	ICAO North Atlantic Region
NBCAP	National Beacon Code Allocation Plan
NDB	Nondirectional radio beacon
NHOP	National Hurricane Operations Plan
NM	Nautical Mile

Abbreviation	*Meaning*
NOAA	National Oceanic and Atmospheric Administration
NOPAC	North Pacific
NORAD	North American Aerospace Defense Command
NOS	National Ocean Service
NOTAM	Notice to Airmen
NRP	National Route Program
NTZ	No transgression zone
NWS	National Weather Service
NWSOP	National Winter Storm Operations Plan
ODALS	Omnidirectional approach lighting system
ONER	Oceanic Navigational Error Report
OS	Operations Supervisor
OTR	Oceanic Transition Route
PAR	Precision approach radar
PAR	Preferred arrival route
PBCT	Proposed Boundary Crossing Time
P/CG	Pilot/Controller Glossary
PDAR	Preferential departure arrival route
PDR	Preferential departure route
PIDP	Programmable Indicator Data Processor
PPI	Plan position indicator
PVD	Plan View Display
RAIL	Runway alignment indicator lights
RAPCON	Radar approach control facility (USAF)
RATCF	Radar air traffic control facility (USN)
RBS	Radar bomb scoring
RCC	Rescue Coordination Center
RCLS	Runway centerline system
RCR	Runway condition reading
RE	Recent (used to qualify weather phenomena such as rain, e.g. recent rain = RERA)
REIL	Runway end identifier lights
RNAV	Area Navigation
RTQC	Real-Time Quality Control
RVR	Runway visual range
RVSM	Reduced Vertical Separation Minimum
RVV	Runway visibility value
SAR	Search and rescue
SELCAL	Selective calling system
SFA	Single frequency approach
SFO	Simulated flameout
SIGMET	Significant meteorological information
STAR	Standard terminal arrival
STARS	Standard Terminal Automation Replacement System
STMC	Supervisory Traffic Management Coordinator
STMCIC	Supervisory Traffic Management Coordinator-in-charge
STOL	Short takeoff and landing
SURPIC	Surface Picture
SVFR	Special Visual Flight Rules
TAA	Terminal Arrival Area
TACAN	TACAN UHF navigational aid (omnidirectional course and distance information)
TCAS	Traffic Alert and Collision Avoidance System
TCDD	Tower Cab Digital Display
TDW	Tower Display Workstation
TDZL	Touchdown zone light system
TMC	Traffic management coordinator
TMU	Traffic management unit
TRACON	Terminal radar approach control
TRSA	Terminal radar service area
UHF	Ultra high frequency
USA	United States Army
USAF	United States Air Force
USN	United States Navy
UTC	Coordinated Universal Time
UTM	Unsuccessful transmission message
UUA	Urgent Pilot Weather Report
VFR	Visual flight rules
VHF	Very High Frequency
VMC	Visual Meteorological Conditions
VOR	VHF navigational aid (omnidirectional course information)
VOR/DME	Collocated VOR and DME navigational aids (VHF course and UHF distance information)
VORTAC	Collocated VOR and TACAN navigation aids (VHF and UHF course and UHF distance information)
VR	VFR military training route
VSCS	Voice Switching and Control System
WATRS	West Atlantic Route System
WSO	Weather Service Office
WST	Convective SIGMET

TBL 1-2-1

NOTE-
Priority handling may be requested by the pilot, or via telephone from CARCAH or the 53rd Weather Reconnaissance Squadron (53WRS) operations center personnel, or in the remarks section of the flight plan.

REFERENCE-
FAAO 7110.65, Weather Reconnaissance Flights, Para 9-3-16.

m. IFR aircraft shall have priority over SVFR aircraft.

REFERENCE-
FAAO 7110.65, Chapter 7, Section 5, Special VFR (SVFR).

n. Providing priority and special handling to expedite the movement of OPEN SKIES observation and demonstration flights.

NOTE-
An OPEN SKIES aircraft has priority over all "regular" air traffic. "Regular" is defined as all aircraft traffic other than:

1. Emergencies.
2. Aircraft directly involved in presidential movement.
3. Forces or activities in actual combat.
4. Lifeguard, MED EVAC, AIR EVAC and active SAR missions.

REFERENCE-
FAAO 7110.65 OPEN SKIES Treaty Aircraft, Para 9-3-19.
FAAO 7210.3, OPEN SKIES Treaty Aircraft, Para 5-3-7.
Treaty on OPEN SKIES, Treaty Document, 102-37.

o. Aircraft operating under the National Route Program are not subject to route limiting restrictions (e.g., published preferred IFR routes, letter of agreement requirements, standard operating procedures).

REFERENCE-
FAAO 7110.65, En Route Data Entries, Para 2-3-2.
FAAO 7110.65, National Route Program (NRP) Information, Para 2-2-15.
FAAO 7110.65, Route or Altitude Amendments, Para 4-2-5.
FAAO 7210.3, Chapter 17, Section 17, National Route Program.

2-1-5. EXPEDITIOUS COMPLIANCE

a. Use the word "immediately" only when expeditious compliance is required to avoid an imminent situation.

b. Use the word "expedite" only when prompt compliance is required to avoid the development of an imminent situation. If an "expedite" climb or descent clearance is issued by ATC, and subsequently the altitude to maintain is changed or restated without an expedite instruction, the expedite instruction is canceled.

c. In either case, if time permits, include the reason for this action.

2-1-6. SAFETY ALERT

Issue a safety alert to an aircraft if you are aware the aircraft is in a position/attitude which, in your judgment, places it in unsafe proximity to terrain, obstructions, or other aircraft. Once the pilot informs you action is being taken to resolve the situation, you may discontinue the issuance of further alerts. Do not assume that because someone else has responsibility for the aircraft that the unsafe situation has been observed and the safety alert issued; inform the appropriate controller.

NOTE-
1. The issuance of a safety alert is a first priority (see para 2-1-2, Duty Priority) once the controller observes and recognizes a situation of unsafe aircraft proximity to terrain, obstacles, or other aircraft. Conditions, such as workload, traffic volume, the quality/limitations of the radar system, and the available lead time to react are factors in determining whether it is reasonable for the controller to observe and recognize such situations. While a controller cannot see immediately the development of every situation where a safety alert must be issued, the controller must remain vigilant for such situations and issue a safety alert when the situation is recognized.

2. Recognition of situations of unsafe proximity may result from MSAW/E-MSAW/LAAS, automatic altitude readouts, Conflict/Mode C Intruder Alert, observations on a PAR scope, or pilot reports.

3. Once the alert is issued, it is solely the pilot's prerogative to determine what course of action, if any, will be taken.

a. Terrain/Obstruction Alert. Immediately issue/initiate an alert to an aircraft if you are aware the aircraft is at an altitude which, in your judgment, places it in unsafe proximity to terrain/obstructions. Issue the alert as follows:

PHRASEOLOGY-
(Identification) LOW ALTITUDE ALERT,

CHECK YOUR ALTITUDE IMMEDIATELY.

THE (as appropriate) MEA/MVA/MOCA/MIA IN YOUR AREA IS (altitude),

or if an aircraft is past the final approach fix (nonprecision approach),

or the outer marker,

or the fix used in lieu of the outer marker (precision approach),

and, if known, issue

THE (as appropriate) MDA/DH IS (altitude).

b. Aircraft Conflict/Mode C Intruder Alert. Immediately issue/initiate an alert to an aircraft if you are aware of another aircraft at an altitude which you believe places them in unsafe proximity. If feasible, offer the pilot an alternate course of action.

c. When an alternate course of action is given, end the transmission with the word "immediately."

PHRASEOLOGY-
TRAFFIC ALERT (call sign) (position of aircraft) ADVISE YOU TURN LEFT/RIGHT (heading),

and/or

CLIMB/DESCEND (specific altitude if appropriate) IMMEDIATELY.

REFERENCE-
FAAO 7110.65, Conflict Alert (CA) and Mode C Intruder (MCI) Alert, Para 5-14-1.
FAAO 7110.65, En Route Minimum Safe Altitude Warning (E-MSAW), Para 5-14-2.
FAAO 7110.65, CA/MCI, Para 5-15-6.
FAAO 7110.65, Altitude Filters, Para 5-2-23.

2-1-7. INFLIGHT EQUIPMENT MALFUNCTIONS

a. When a pilot reports an inflight equipment malfunction, determine the nature and extent of any special handling desired.

NOTE-
Inflight equipment malfunctions include partial or complete failure of equipment which may affect either safety and/or the ability of the flight to proceed under IFR in the ATC system. Controllers may expect reports from pilots regarding VOR, TACAN, ADF, GPS, or low frequency navigation receivers, impairment of air-ground communications capability, or other equipment deemed appropriate by the pilot (e.g. airborne weather radar). Pilots should communicate the nature and extent of any assistance desired from ATC.

b. Provide the maximum assistance possible consistent with equipment, workload, and any special handling requested.

c. Relay to other controllers or facilities who will subsequently handle the aircraft, all pertinent details concerning the aircraft and any special handling required or being provided.

2-1-8. MINIMUM FUEL

If an aircraft declares a state of "minimum fuel," inform any facility to whom control jurisdiction is transferred of the minimum fuel problem and be alert for any occurrence which might delay the aircraft en route.

NOTE-
Use of the term "minimum fuel" indicates recognition by a pilot that his/her fuel supply has reached a state where, upon reaching destination, he/she cannot accept any undue delay. This is not an emergency situation but merely an advisory that indicates an emergency situation is possible should any undue delay occur. A minimum fuel advisory does not imply a need for traffic priority. Common sense and good judgment will determine the extent of assistance to be given in minimum fuel situations. If, at any time, the remaining usable fuel supply suggests the need for traffic priority to ensure a safe landing, the pilot should declare an emergency and report fuel remaining in minutes.

2-1-9. REPORTING ESSENTIAL FLIGHT INFORMATION

Report as soon as possible to the appropriate FSS, airport manager's office, ARTCC, approach control facility, operations office, or military operations office any information concerning components of the NAS or any flight conditions which may have an adverse effect on air safety.

NOTE-
FSS's are responsible for classifying and disseminating Notices to Airmen.

REFERENCE-
FAAO 7110.65, Timely Information, Para 3-3-3.
FAAO 7110.65, Service Limitations, Para 5-1-6.
FAAO 7210.3, Periodic Maintenance, Para 3-1-2.
USN, See OPNAVINST 3721.30.

2-1-10. NAVAID MALFUNCTIONS

a. When an aircraft reports a ground-based NAVAID malfunction, take the following actions:

1. Request a report from a second aircraft.

2. If the second aircraft reports normal operations, continue use and inform the first aircraft. Record the incident on FAA Form 7230-4 or appropriate military form.

3. If the second aircraft confirms the malfunction or in the absence of a second aircraft report, activate the standby equipment or request the monitor facility to activate.

4. If normal operation is reported after the standby equipment is activated, continue use, record the incident on FAA Form 7230-4 or appropriate military form, and notify Airway Facilities (AF) personnel (the Systems Engineer of the ARTCC when an en route aid is involved).

5. If continued malfunction is reported after the standby equipment is activated or the standby equipment cannot be activated, inform AF personnel and request advice on whether or not the aid should be shut down. In the absence of a second aircraft report, advise the AF personnel of the time of the initial aircraft report and the estimated time a second aircraft report could be obtained.

b. When an aircraft reports a GPS/GNSS anomaly, request the following information and/or take the following actions:

1. Record the following minimum information:

   (a) Aircraft call sign.

   (b) Location.

   (c) Altitude.

   (d) Date/time of occurrence.

2. Direct the aircraft to file a complete report with AFSS/FSS.

3. Broadcast the anomaly report to other aircraft as necessary.

2-1-11. USE OF MARSA

a. MARSA may only be applied to military operations specified in a letter of agreement or other appropriate FAA or military document.

NOTE-
Application of MARSA is a military command prerogative. It will not be invoked indiscriminately by individual units or pilots. It will be used only for IFR operations requiring its use. Commands authorizing MARSA will ensure that its implementation and terms of use are documented and coordinated with the control agency having jurisdiction over the area in which the operations are conducted. Terms of use will assign responsibility and provide for separation among participating aircraft.

b. ATC facilities do not invoke or deny MARSA. Their sole responsibility concerning the use of MARSA is to provide separation between military aircraft engaged in MARSA operations and other nonparticipating IFR aircraft.

c. DOD shall ensure that military pilots requesting special-use airspace/ATCAA's have coordinated with the scheduling agency, have obtained approval for entry, and are familiar with the appropriate MARSA procedures. ATC is not responsible for determining which military aircraft are authorized to enter special-use airspace/ATCAA's.

REFERENCE-
FAAO 7110.65, Military Aerial Refueling, Para 9-3-10.

2-1-12. MILITARY PROCEDURES

Military procedures in the form of additions, modifications, and exceptions to the basic FAA procedure are prescribed herein when a common procedure has not been attained or to fulfill a specific requirement. They shall be applied by:

a. ATC facilities operated by that military service.

EXAMPLE-
1. An Air Force facility providing service for an Air Force base would apply USAF procedures to all traffic regardless of class.

2. A Navy facility providing service for a Naval Air Station would apply USN procedures to all traffic regardless of class.

b. ATC facilities, regardless of their parent organization (FAA, USAF, USN, USA), supporting a designated military airport exclusively. This designation determines which military procedures are to be applied.

EXAMPLE-
1. An FAA facility supports a USAF base exclusively; USAF procedures are applied to all traffic at that base.

2. An FAA facility provides approach control service for a Naval Air Station as well as supporting a civil airport; basic FAA procedures are applied at both locations by the FAA facility.

3. A USAF facility supports a USAF base and provides approach control service to a satellite civilian airport; USAF procedures are applied at both locations by the USAF facility.

REFERENCE-
FAAO 7110.65, Annotations, Para 1-2-5.

c. Other ATC facilities when specified in a letter of agreement.

EXAMPLE-
A USAF unit is using a civil airport supported by an FAA facility- USAF procedures will be applied as specified in a letter of agreement between the unit and the FAA facility to the aircraft of the USAF unit. Basic FAA procedures will be applied to all other aircraft.

2-1-13. FORMATION FLIGHTS

Control formation flights as a single aircraft. When individual control is requested, issue advisory information which will assist the pilots in attaining separation. When pilot reports indicate separation has been established, issue control instructions as required.

NOTE-
1. Separation responsibility between aircraft within the formation during transition to individual control rests with the pilots concerned until standard separation has been attained.

2. Formation join-up and breakaway will be conducted in VFR weather conditions unless prior authorization has been obtained from ATC or individual control has been approved.

REFERENCE-
FAAO 7110.65, Additional Separation for Formation Flights, Para 5-5-8.
P/CG Term- Formation Flight.

2-1-14. COORDINATE USE OF AIRSPACE

a. Ensure that the necessary coordination has been accomplished before you allow an aircraft under your control to enter another controller's area of jurisdiction.

b. Before you issue control instructions directly or relay through another source to an aircraft which is within another controller's area of jurisdiction that will change that aircraft's heading, route, speed, or altitude, ensure that coordination has been accomplished with each of the controllers listed below whose area of jurisdiction is affected by those instructions unless otherwise specified by a letter of agreement or a facility directive:

1. The controller within whose area of jurisdiction the control instructions will be issued.

2. The controller receiving the transfer of control.

3. Any intervening controller(s) through whose area of jurisdiction the aircraft will pass.

c. If you issue control instructions to an aircraft through a source other than another controller (e.g. ARINC, FSS, another pilot) ensure that the necessary coordination has been accomplished with any controllers listed in subparas b1, 2, and 3, whose area of jurisdiction is affected by those instructions unless otherwise specified by a letter of agreement or a facility directive.

REFERENCE-
FAAO 7110.65, Control Transfer, Para 2-1-15.
FAAO 7110.65, Adjacent Airspace, Para 5-5-10.
FAAO 7110.65, Transferring Controller Handoff, Para 5-4-5.
FAAO 7110.65, Receiving Controller Handoff, Para 5-4-6.

2-1-15. CONTROL TRANSFER

a. Transfer control of an aircraft in accordance with the following conditions:

1. At a prescribed or coordinated location, time, fix, or altitude; or,

2. At the time a radar handoff and frequency change to the receiving controller have been completed and when authorized by a facility directive or letter of agreement which specifies the type and extent of control that is transferred.

REFERENCE-
FAAO 7110.65, Coordinate Use of Airspace, Para 2-1-14.
FAAO 7110.65, Transferring Controller Handoff, Para 5-4-5.
FAAO 7110.65, Receiving Controller Handoff, Para 5-4-6.

b. Transfer control of an aircraft only after eliminating any potential conflict with other aircraft for which you have separation responsibility.

c. Assume control of an aircraft only after it is in your area of jurisdiction unless specifically coordinated or as specified by letter of agreement or a facility directive.

2-1-16. SURFACE AREAS

a. Coordinate with the appropriate nonapproach control tower on an individual aircraft basis before issuing a clearance which would require flight within a surface area for which the tower has responsibility unless otherwise specified in a letter of agreement.

REFERENCE-
FAAO 7210.3, Letters of Agreement, Para 4-3-1.
14 CFR Section 91.127, Operating on or in the Vicinity of an Airport in Class E Airspace.
P/CG Term- Surface Area.

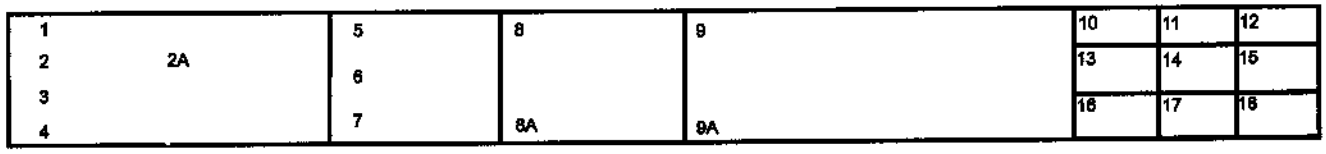
b. Coordinate with the appropriate control tower for transit authorization when you are providing radar traffic advisory service to an aircraft that will enter another facility's airspace.

NOTE-
The pilot is not expected to obtain his/her own authorization through each area when in contact with a radar facility.

2-3-3. TERMINAL DATA ENTRIES

a. Arrivals:

Information recorded on the flight progress strips (FAA Forms 7230-7.1, 7230-7.2, and 7230-8) shall be entered in the correspondingly numbered spaces. Facility managers can authorize omissions and/or optional use of spaces 2A, 9A, and 10-18, if no misunderstanding will result. These omissions and/or optional uses shall be specified in a facility directive.



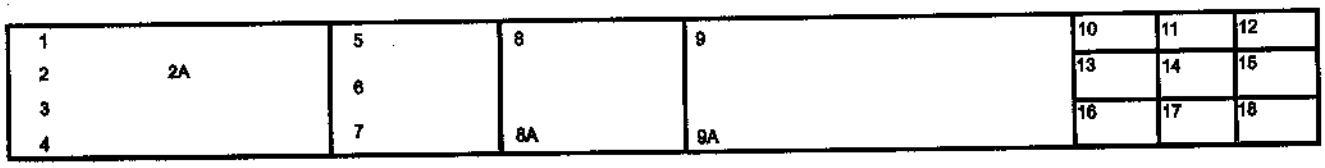
Block	*Information Recorded*
1.	Aircraft identification.
2.	Revision number (FDIO locations only).
2A.	Strip request originator. (At FDIO locations this indicates the sector or position that requested a strip be printed.)
3.	Number of aircraft if more than one, TCAS/ heavy aircraft indicator if appropriate, type of aircraft, and aircraft equipment suffix. The TCAS indicator is "T/" and the heavy aircraft indicator is "H/". For aircraft that are both TCAS and heavy, the indicator is "B/". For B757, the indicator is "F/" and for B757 with TCAS, the indicator is "L/".
4.	Computer identification number if required.
5.	Secondary radar (beacon) code assigned.
6.	(FDIO Locations.) The previous fix will be printed. (Non-FDIO Locations.) Use of the inbound airway. This function is restricted to facilities where flight data is received via interphone when agreed upon by the center and terminal facilities.
7.	Coordination fix.
8.	Estimated time of arrival at the coordination fix or destination airport.

Block	*Information Recorded*
8A.	**OPTIONAL USE,** when voice recorders are operational; **REQUIRED USE,** when the voice recorders are not operating and strips are being used at the facility. This space is used to record reported RA events when the voice recorders are not operational and strips are being used at the facility. The letters RA followed by a climb or descent arrow (if the climb or descent action is reported) and the time (hhmm) the event is reported.
9.	Altitude (in hundreds of feet) and remarks.
NOTE-	*Altitude information may be written in thousands of feet provided the procedure is authorized by the facility manager, and is defined in a facility directive, i. e., FL 230 as 23, 5,000 feet as 5, and 2,800 as 2.8.*
9A.	Minimum fuel, destination airport/point out/radar vector/speed adjustment information. Air Traffic managers may authorize in a facility directive the omission of any of these items, **except minimum fuel,** if no misunderstanding will result.
NOTE-	*Authorized omissions and optional use of spaces shall be specified in the facility directive concerning strip marking procedures.*
10-18.	Enter data as specified by a facility directive. Radar facility personnel need not enter data in these spaces except when nonradar procedures are used or when radio recording equipment is inoperative.

FIG 2-3-3

b. Departures:

Information recorded on the flight progress strips (FAA Forms 7230-7.1, 7230-7.2, and 7230-8) shall be entered in the correspondingly numbered spaces. Facility managers can authorize omissions and/or optional use of spaces 2A, 9A, and 10-18, if no misunderstanding will result. These omissions and/or optional uses shall be specified in a facility directive.



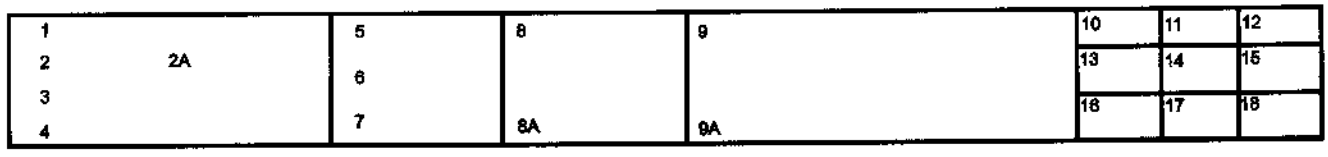
Block	*Information Recorded*
1.	Aircraft identification.
2.	Revision number (FDIO locations only).
2A.	Strip request originator. (At FDIO locations this indicates the sector or position that requested a strip be printed.)
3.	Number of aircraft if more than one, TCAS/ heavy aircraft indicator if appropriate, type of aircraft, and aircraft equipment suffix. The TCAS indicator is "T/" and the heavy aircraft indicator is "H/". For aircraft that are both TCAS and heavy, the indicator is "B/". For B757, the indicator is "F/" and for B757 with TCAS, the indicator is "L/".
4.	Computer identification number if required.
5.	Secondary radar (beacon) code assigned.
6.	Proposed departure time.
7.	Requested altitude.
NOTE-	*Altitude information may be written in thousands of feet provided the procedure is authorized by the facility manager, and is defined in a facility directive, i. e., FL 230 as 23, 5,000 feet as 5, and 2,800 as 2.8.*
8.	Departure airport.

Block	*Information Recorded*
8A.	**OPTIONAL USE,** when voice recorders are operational; **REQUIRED USE,** when the voice recorders are not operating and strips are being used at the facility. This space is used to record reported RA events when the voice recorders are not operational and strips are being used at the facility. The letters RA followed by a climb or descent arrow (if the climb or descent action is reported) and the time (hhmm) the event is reported.
9.	**Computer-generated:** Route, destination, and remarks. Manually enter altitude/altitude restrictions in the order flown, if appropriate, and remarks.
9.	**Hand-prepared:** Clearance limit, route, altitude/altitude restrictions in the order flown, if appropriate, and remarks.
NOTE-	*Altitude information may be written in thousands of feet provided the procedure is authorized by the facility manager, and is defined in a facility directive, i. e., FL 230 as 23, 5,000 feet as 5, and 2,800 as 2.8.*
9A.	Point out/radar vector/speed adjustment information.
10-18.	Enter data as specified by a facility directive. Items, such as departure time, runway used for takeoff, check marks to indicate information forwarded or relayed, may be entered in these spaces.

FIG 2-3-4

c. Overflights:

Information recorded on the flight progress strips (FAA Forms 7230-7.1, 7230-7.2, and 7230-8) shall be entered in the correspondingly numbered spaces. Facility managers can authorize omissions and/or optional use of spaces 2A, 9A, and 10-18, if no misunderstanding will result. These omissions and/or optional uses shall be specified in a facility directive.



Block	*Information Recorded*
1.	Aircraft identification.
2.	Revision number (FDIO locations only).
2A.	Strip request originator. (At FDIO locations this indicates the sector or position that requested a strip be printed.)
3.	Number of aircraft if more than one, TCAS/ heavy aircraft indicator if appropriate, type of aircraft, and aircraft equipment suffix. The TCAS indicator is "T/" and the heavy aircraft indicator is "H/". For aircraft that are both TCAS and heavy, the indicator is "B/". For B757, the indicator is "F/" and for B757 with TCAS, the indicator is "L/".
4.	Computer identification number if required.
5.	Secondary radar (beacon) code assigned.
6.	Coordination fix.
7.	Overflight coordination indicator (FDIO locations only).
NOTE-	*The overflight coordination indicator identifies the facility to which flight data has been forwarded.*
8.	Estimated time of arrival at the coordination fix.

Block	*Information Recorded*
8A.	**OPTIONAL USE,** when voice recorders are operational; **REQUIRED USE,** when the voice recorders are not operating and strips are being used at the facility. This space is used to record reported RA events when the voice recorders are not operational and strips are being used at the facility. The letters RA followed by a climb or descent arrow (if the climb or descent action is reported) and the time (hhmm) the event is reported.
9.	Altitude and route of flight through the terminal area.
NOTE-	*Altitude information may be written in thousands of feet provided the procedure is authorized by the facility manager, and is defined in a facility directive, i. e., FL 230 as 23, 5,000 feet as 5, and 2,800 as 2.8.*
9A.	Point out/radar vector/speed adjustment information.
10-18.	Enter data as specified by a facility directive.

FIG 2-3-5

NOTE-
National standardization of items (10 through 18) is not practical because of regional and local variations in operating methods; e.g., single fix, multiple fix, radar, tower en route control, etc.

d. Air traffic managers at automated terminal radar facilities may waive the requirement to use flight progress strips provided:

1. Backup systems such as multiple radar sites/systems or single site radars with CENRAP are utilized.

2. Local procedures are documented in a facility directive. These procedures should include but not be limited to:

(a) Departure areas and/or procedures.

(b) Arrival procedures.

(c) Overflight handling procedures.

(d) Transition from radar to nonradar.

(e) Transition from ARTS to non-ARTS.

(f) Transition from ASR to CENRAP.

(g) Transition to or from ESL.

3. No misunderstanding will occur as a result of no strip usage.

4. Unused flight progress strips, facility developed forms and/or blank notepads shall be provided for controller use.

5. Facilities shall revert to flight progress strip usage if backup systems referred to in subpara a are not available.

e. Air traffic managers at FDIO locations may authorize reduced lateral spacing between fields so as to print all FDIO data to the left of the strip perforation. When using FAA Form 7230-7.2, all items will retain the same relationship to each other as they do when the full length strip (FAA Form 7230-7.1) is used.

2-3-4. AIRCRAFT IDENTITY

Indicate aircraft identity by one of the following using combinations not to exceed seven alphanumeric characters:

a. Civil aircraft, including air-carrier aircraft letter-digit registration number including the letter "T" prefix for air taxi aircraft, the letter "L" for lifeguard aircraft, 3-letter aircraft company designator specified in FAAO 7340.1, Contractions, followed by the trip or flight number. Use the operating air carrier's company name in identifying equipment interchange flights.

EXAMPLE-
"N12345."
"TN5552Q."
"AAI192."
"LN751B."

NOTE-
The letter "L" is not to be used for air carrier/air taxi lifeguard aircraft.

b. Military Aircraft.

1. Prefixes indicating branch of service and/or type of mission followed by the last 5 digits of the serial number (the last 4 digits for CAF/CAM/CTG). (See TBL 2-3-1 and TBL 2-3-2.)

2. Pronounceable words of 3, 4, 5, and 6 letters followed by a 4-, 3-, 2-, or 1-digit number.

EXAMPLE-
"SAMP Three One Six."

3. Assigned double-letter 2-digit flight number.

4. Navy or Marine fleet and training command aircraft, one of the following:

(a) The service prefix and 2 letters (use phonetic alphabet equivalent) followed by 2 or 3 digits.

Branch of Service Prefix

Prefix	*Branch*
A	U.S. Air Force
C	U.S. Coast Guard
G	Air or Army National Guard
R	U.S. Army
VM	U.S. Marine Corps
VV	U.S. Navy
CAF	Canadian Armed Force
CAM	Canadian Armed Force (Transport Command)
CTG	Canadian Coast Guard

TBL 2-3-1

Military Mission Prefix

Prefix	*Mission*
E	Medical Air Evacuation
F	Flight Check
L	LOGAIR (USAF Contract)
RCH	AMC (Air Mobility Command)
S	Special Air Mission

TBL 2-3-2

(b) The service prefix and a digit and a letter (use phonetic alphabet equivalent) followed by 2 or 3 digits.

c. Special-use. Approved special-use identifiers.

2-3-5. AIRCRAFT TYPE

Use the approved codes listed in Appendices A through C to indicate aircraft type.

2-3-6. USAF/USN UNDERGRADUATE PILOTS

To identify aircraft piloted by solo USAF/USN undergraduate student pilots (who may occasionally request revised clearances because they normally are restricted to flight in VFR conditions), the aircraft identification in the flight plan shall include the letter "Z" as a suffix. Do not use this suffix, however, in ground-to-air communication.

NOTE-
USAF solo students who have passed an instrument certification check may penetrate cloud layers in climb or descent only. Requests for revised clearances to avoid clouds in level flight can still be expected. This does not change the requirement to use the letter "Z" as a suffix to the aircraft identification.

REFERENCE-
FAAO 7110.65, Aircraft Identification, Para 2-4-20.
FAAO 7610.4, Chapter 12, Section 10, USAF Undergraduate Flying Training (UFT)/Pilot Instructor Training (PIT).

2-3-7. AIRCRAFT EQUIPMENT SUFFIX

a. Indicate, for both VFR and IFR operations, the aircraft's radar transponder, DME, or navigation capability by adding the appropriate symbol, preceded by a slant. (See TBL 2-3-3.)

b. When forwarding this information, state the aircraft type followed by the word "slant" and the appropriate phonetic letter equivalent of the suffix.

EXAMPLE-
"Cessna Three-ten slant Tango."
"A-Ten slant November."
"F-Sixteen slant Papa."
"Seven-sixty-seven slant Golf."

2-3-8. CLEARANCE STATUS

Use an appropriate clearance symbol followed by a dash (-) and other pertinent information to clearly show the clearance status of an aircraft. To indicate delay status use:

a. The symbol "H" at the clearance limit when holding instructions have been included in the aircraft's original clearance. Show detailed holding information following the dash when holding differs from the established pattern for the fix; i.e., turns, leg lengths, etc.

b. The symbols "F" or "O" to indicate the clearance limit when a delay is not anticipated.

2-3-9. CONTROL SYMBOLOGY

Use authorized control and clearance symbols or abbreviations for recording clearances, reports, and instructions. Control status of aircraft must always be current. You may use:

a. Plain language markings when it will aid in understanding information.

b. Locally approved identifiers. Use these only within your facility and not on teletypewriter or interphone circuits.

c. Plain sheets of paper or locally prepared forms to record information when flight progress strips are not used. (See TBL 2-3-4 and TBL 2-3-5.)

d. Control Information Symbols
(See FIG 2-3-6 and FIG 2-3-7.)

REFERENCE-
FAAO 7110.65, Exceptions, Para 4-5-3.

Aircraft Equipment Suffixes

SUFFIX	*AIRCRAFT EQUIPMENT SUFFIXES*
	NO DME
/X	No transponder
/T	Transponder with no Mode C
/U	Transponder with Mode C
	DME
/D	No transponder
/B	Transponder with no Mode C
/A	Transponder with Mode C
	TACAN ONLY
/M	No transponder
/N	Transponder with no Mode C
/P	Transponder with Mode C
	AREA NAVIGATION (RNAV)
/Y	LORAN, VOR/DME, or INS with no transponder
/C	LORAN, VOR/DME, or INS, transponder with no Mode C
/I	LORAN, VOR/DME, or INS, transponder with Mode C
	ADVANCED RNAV WITH TRANSPONDER AND MODE C (If an aircraft is unable to operate with a transponder and/or Mode C, it will revert to the appropriate code listed above under Area Navigation.)
/E	Flight Management System (FMS) with en route, terminal, and approach capability. Equipment requirements are: (a) Dual FMS which meets the specifications of AC 25-15, Approval of Flight Management Systems in Transport Category Airplanes; AC 20-129, Airworthiness Approval of Vertical Navigation (VNAV) Systems for use in the U.S. NAS and Alaska; AC 20-130A, Airworthiness Approval of Navigation or Flight Management Systems Integrating Multiple Navigation Sensors; or equivalent criteria as approved by Flight Standards. (b) A flight director and autopilot control system capable of following the lateral and vertical FMS flight path. (c) At least dual inertial reference units (IRU's). (d) A database containing the waypoints and speed/altitude constraints for the route and/or procedure to be flown that is automatically loaded into the FMS flight plan. (e) An electronic map. (U.S. and U.S. territories only unless otherwise authorized.)
/F	A single FMS with en route, terminal, and approach capability that meets the equipment requirements of /E, (a) through (d), above. (U.S. and U.S. territories only unless otherwise authorized.)
/G	Global Positioning System (GPS)/Global Navigation Satellite System (GNSS) equipped aircraft with en route and terminal capability
/R	Required Navigational Performance (Denotes capability to operate in RNP designated airspace and routes)
/W	Reduced Vertical Separation Minima (RVSM)
/Q	Required Navigation Performance (RNP) and Reduced Vertical Separation Minima (RVSM) (Indicate approval for application of RNP and RVSM separation standards.) It should be noted that /Q is for automation purposes only and will not be filed by system users. FAA processors will convert the combination of /R+/W to =/Q.

TBL 2-3-3

2-4-17. NUMBERS USAGE

State numbers as follows:

a. Serial numbers. The separate digits.

EXAMPLE-

Number	*Statement*
11,495	"One one four niner five."
20,069	"Two zero zero six niner."

b. Altitudes or flight levels:

1. Altitudes. Pronounce each digit in the number of hundreds or thousands followed by the word "hundred" or "thousand" as appropriate.

EXAMPLE-

Number	*Statement*
10,000	"One zero thousand."
11,000	"One one thousand."
17,900	"One seven thousand niner hundred."

NOTE-
Altitudes may be restated in group form for added clarity if the controller chooses.

EXAMPLE-

Number	*Statement*
10,000	"Ten thousand."
11,000	"Eleven thousand."
17,900	"Seventeen thousand niner hundred."

2. Flight levels. The words "flight level" followed by the separate digits of the flight level.

EXAMPLE-

Flight level	*Statement*
180	"Flight level one eight zero."
275	"Flight level two seven five."

3. MDA/DH Altitudes. The separate digits of the MDA/DH altitude.

EXAMPLE-

MDA/DH Altitude	*Statement*
1,320	"Minimum descent altitude, one three two zero."
486	"Decision height, four eight six."

c. Time:

1. General time information. The four separate digits of the hour and minute/s in terms of UTC.

EXAMPLE-

UTC	*Time (12 hr.)*	*Statement*
0715	1:15 a.m. CST	"Zero seven one five."
1915	1:15 p.m. CST	"One niner one five."

2. Upon request. The four separate digits of the hours and minute/s in terms of UTC followed by the local standard time equivalent; or the local time equivalent only. Local time may be based on the 24-hour clock system, and the word "local" or the time zone equivalent shall be stated when other than UTC is referenced. The term "ZULU" may be used to denote UTC.

EXAMPLE-

UTC	*Time (24 hr.)*	*Time (12 hr.)*	*Statement*
2230	1430 PST	2:30 p.m.	"Two two three zero, one four three zero Pacific or Local." or "Two-thirty P-M."

3. Time check. The word "time" followed by the four separate digits of the hour and minutes, and nearest quarter minute. Fractions of a quarter minute less than eight seconds are stated as the preceding quarter minute; fractions of a quarter minute of eight seconds or more are stated as succeeding quarter minute.

EXAMPLE-

Time	*Statement*
1415:06	"Time, one four one five."
1415:10	"Time, one four one five and one-quarter."

4. Abbreviated time. The separate digits of the minutes only.

EXAMPLE-

Time	*Statement*
1415	"One five."
1420	"Two zero."

5. Field elevation. The words "field elevation" followed by the separate digits of the elevation.

EXAMPLE-

Elevation	*Statement*
17 feet	"Field elevation, one seven."
817 feet	"Field elevation, eight one seven."
2,817 feet	"Field elevation, two eight one seven."

d. The number "0" as "zero" except where it is used in approved "group form" for authorized aircraft call signs, and in stating altitudes.

EXAMPLE-

As Zero	*As Group*
"Field elevation one six zero."	"Western five thirty."
"Heading three zero zero."	"EMAIR One Ten."
"One zero thousand five hundred."	"Ten thousand five hundred."

e. Altimeter setting. The word "altimeter" followed by the separate digits of the altimeter setting.

EXAMPLE-

Setting	*Statement*
30.01	"Altimeter, three zero zero one."

f. Surface wind. The word "wind" followed by the separate digits of the indicated wind direction to the nearest 10-degree multiple, the word "at" and the separate digits of the indicated velocity in knots.

EXAMPLE-
"Wind zero three zero at two five."
"Wind two seven zero at one five gusts three five."

g. Heading. The word "heading" followed by the three separate digits of the number of degrees, omitting the word "degrees." Use heading 360 degrees to indicate a north heading.

EXAMPLE-

Heading	*Statement*
5 degrees	"Heading zero zero five."
30 degrees	"Heading zero three zero."
360 degrees	"Heading three six zero."

h. Radar beacon codes. The separate digits of the 4-digit code.

EXAMPLE-

Code	*Statement*
1000	"One zero zero zero."
2100	"Two one zero zero."

i. Runways. The word "runway," followed by the separate digits of the runway designation. For a parallel runway, state the word "left," "right," or "center" if the letter "L," "R," or "C" is included in the designation.

EXAMPLE-

Designation	*Statement*
3	"Runway Three."
8L	"Runway Eight Left."
27R	"Runway Two Seven Right."

j. Frequencies.

1. The separate digits of the frequency, inserting the word "point" where the decimal point occurs.

(a) Omit digits after the second digit to the right of the decimal point.

(b) When the frequency is in the L/MF band, include the word "kiloHertz."

EXAMPLE-

Frequency	*Statement*
126.55 MHz	"One two six point five five."
369.0 MHz	"Three six niner point zero."
121.5 MHz	"One two one point five."
135.275 MHz	"One three five point two seven."
302 kHz	"Three zero two kiloHertz."

2. *USAF/USN.* Local channelization numbers may be used in lieu of frequencies for locally based aircraft when local procedures are established to ensure that local aircraft and ATC facilities use the same channelization.

EXAMPLE-

Frequency	*Statement*
275.8 MHz	"Local channel one six."

3. Issue MLS/TACAN frequencies by stating the assigned two- or three-digit channel number.

EXAMPLE-
"M-L-S channel Five Three Zero."
"TACAN channel Nine Seven."

Section 6. Weather Information

2-6-1. FAMILIARIZATION

Become familiar with pertinent weather information when coming on duty, and stay aware of current weather information needed to perform ATC duties.

2-6-2. HAZARDOUS INFLIGHT WEATHER ADVISORY SERVICE (HIWAS)

Controllers shall advise pilots of hazardous weather that may impact operations within 150 NM of their sector or area of jurisdiction. Hazardous weather information contained in HIWAS broadcasts includes Airmen's Meteorological Information (AIRMET), Significant Meteorological Information (SIGMET), Convective SIGMET (WST), Urgent Pilot Weather Reports (UUA), and Center Weather Advisories (CWA). Facilities shall review alert messages to determine the geographical area and operational impact for hazardous weather information broadcasts. The broadcast is not required if aircraft on your frequency(s) will not be affected.

a. Controllers within commissioned HIWAS areas shall broadcast a HIWAS alert on all frequencies, except emergency frequency, upon receipt of hazardous weather information. Controllers are required to disseminate data based on the operational impact on the sector or area of control jurisdiction.

NOTE-
The inclusion of the type and number of weather advisory responsible for the HIWAS advisory is optional.

PHRASEOLOGY-
ATTENTION ALL AIRCRAFT. HAZARDOUS WEATHER INFORMATION (SIGMET, Convective SIGMET, AIRMET, Urgent Pilot Weather Report (UUA), or Center Weather Advisory (CWA), Number or Numbers) FOR (geographical area) AVAILABLE ON HIWAS, FLIGHT WATCH, OR FLIGHT SERVICE FREQUENCIES.

b. Controllers outside of commissioned HIWAS areas shall:

1. Advise pilots of the availability of hazardous weather advisories. Pilots requesting additional information should be directed to contact the nearest Flight Watch or Flight Service.

2. Apply the same procedure when HIWAS outlets, or outlets with radio coverage extending into your sector or airspace under your jurisdiction, are out of service.

PHRASEOLOGY-
ATTENTION ALL AIRCRAFT. HAZARDOUS WEATHER INFORMATION FOR (geographical area) AVAILABLE FROM FLIGHT WATCH OR FLIGHT SERVICE.

c. Terminal facilities have the option to limit hazardous weather information broadcasts as follows: Tower cab and approach control facilities may opt to broadcast hazardous weather information alerts only when any part of the area described is within 50 NM of the airspace under their jurisdiction.

REFERENCE-
AIM, Chapter 7, Section 1, Meteorology, Para 7-1-5 through Para 7-1-9.

2-6-3. PIREP INFORMATION

Significant PIREP information includes reports of strong frontal activity, squall lines, thunderstorms, light to severe icing, wind shear and turbulence (including clear air turbulence) of moderate or greater intensity, volcanic eruptions and volcanic ash clouds, and other conditions pertinent to flight safety.

REFERENCE-
FAAO 7110.65, Low Level Wind Shear Advisories, Para 3-1-8.
FAAO 7210.3, Handling of SIGMET's, CWA's, and PIREP's, Para 6-3-1.
AIM, Flight Operations in Volcanic Ash, Para 7-5-8.
FAAO 7210.3, SIGMET and PIREP Handling, Para 10-3-1.

a. Solicit PIREP's when requested or when one of the following conditions exists or is forecast for your area of jurisdiction:

1. Ceilings at or below 5,000 feet. These PIREP's shall include cloud base/top reports when feasible.

TERMINAL. Ensure that at least one descent/climb-out PIREP, including cloud base/s, top/s, and other related phenomena, is obtained each hour.

EN ROUTE. When providing approach control services, the requirements stated in TERMINAL above apply.

2. Visibility (surface or aloft) at or less than 5 miles.

3. Thunderstorms and related phenomena.

4. Turbulence of moderate degree or greater.

5. Icing of light degree or greater.

6. Wind shear.

7. Volcanic ash clouds.

NOTE-
Pilots may forward PIREP's regarding volcanic activity using the format described in the Volcanic Activity Reporting Form (VAR) as depicted in the AIM, Appendix 2.

8. *TERMINAL.* Braking Action Advisories are in effect.

REFERENCE-
FAAO 7110.65, Braking Action Advisories, Para 3-3-5.
P/CG Term- Braking Action Advisories.

b. Record with the PIREP's:

1. Time.

2. Aircraft position.

3. Type aircraft.

4. Altitude.

5. When the PIREP involves icing include:

(a) Icing type and intensity.

(b) Air temperature in which icing is occurring.

c. Obtain PIREP's directly from the pilot, or if the PIREP has been requested by another facility, you may instruct the pilot to deliver it directly to that facility.

PHRASEOLOGY-
REQUEST FLIGHT CONDITIONS.

Or if appropriate,

REQUEST (specific conditions; i.e., ride, cloud, visibility, etc.) CONDITIONS.

If necessary,

OVER (fix),

or

ALONG PRESENT ROUTE,

or

BETWEEN (fix) AND (fix).

d. Handle PIREP's as follows:

1. Relay pertinent PIREP information to concerned aircraft in a timely manner.

2. *EN ROUTE.* Relay all operationally significant PIREP's to the facility weather coordinator.

3. *TERMINAL.* Relay all operationally significant PIREP's to:

(a) The appropriate intrafacility positions.

(b) The FSS serving the area in which the report was obtained.

NOTE-
The FSS is responsible for long line dissemination.

(c) Other concerned terminal or en route ATC facilities, including non-FAA facilities.

(d) Use the word *gain* and/or *loss* when describing to pilots the effects of wind shear on airspeed.

EXAMPLE-
"Delta Seven Twenty-one, a Boeing Seven Twenty-seven, previously reported wind shear, loss of Two Five knots at Four Hundred feet."

"U.S. Air Seventy-six, a D-C Niner, previously reported wind shear, gain of Twenty-Five knots between Niner Hundred and Six Hundred feet, followed by a loss of Five Zero knots between Five Hundred feet and the surface."

REFERENCE-
AIM, Wind Shear PIREP's, Para 7-1-22.

2-6-4. WEATHER AND CHAFF SERVICES

a. Issue pertinent information on observed/reported weather or chaff areas. Provide radar navigational guidance and/or approve deviations around weather or chaff areas when requested by the pilot. Do not use the word "turbulence" in describing radar-derived weather.

1. Issue weather and chaff information by defining the area of coverage in terms of azimuth (by referring to the 12-hour clock) and distance from the aircraft or by indicating the general width of the area and the area of coverage in terms of fixes or distance and direction from fixes.

2. Issue the level of echo intensity when that information is available.

3. When equipment limitations exist, controllers shall, at a minimum, ensure that the highest available level of echo intensity within their area of jurisdiction is displayed.

4. When a deviation cannot be approved as requested and the situation permits, suggest an alternative course of action.

b. In areas of significant weather, plan ahead and be prepared to suggest, upon pilot request, the use of alternative routes/altitudes.

NOTE-
Weather significant to the safety of aircraft includes such conditions as tornadoes, lines of thunderstorms, embedded thunderstorms, large hail, wind shear, moderate to extreme turbulence (including CAT), and light to severe icing.

c. Inform any tower for which you provide approach control services if you observe any weather echoes on radar which might affect their operations.

PHRASEOLOGY-
WEATHER/CHAFF AREA BETWEEN (number) O'CLOCK AND (number) O'CLOCK (number) MILES,

or

(number) MILE BAND OF WEATHER/CHAFF FROM (fix or number of miles and direction from fix) TO (fix or number of miles and direction from fix),

or

LEVEL (number(s)) WEATHER ECHO BETWEEN (number) O'CLOCK AND (number) O'CLOCK, (number) MILES. MOVING (direction) AT (number) KNOTS, TOPS (altitude),

or

DEVIATION APPROVED, (restrictions if necessary), ADVISE WHEN ABLE TO:

RETURN TO COURSE,
or
RESUME OWN NAVIGATION
or
FLY HEADING (heading)
or
PROCEED DIRECT TO (name of NAVAID). UNABLE DEVIATION (state possible alternate course of action).

EXAMPLE-
1. *"Level five weather echo between eleven o'clock and one o'clock, one zero miles. Moving east at two zero knots, tops flight level three niner zero."*

2. *"Level four weather echo between ten o'clock and two o'clock, one five miles. Weather area is two five miles in diameter."*

3. *"Level four and five weather echoes between ten o'clock and two o'clock, one five miles. Weather area is two five miles in diameter."*

4. *"Level two through four weather echoes between ten o'clock and two o'clock, one five miles. Weather area is two five miles in diameter."*

NOTE-
Phraseology using level number(s) is only applicable when the radar weather echo intensity information is determined by NWS radar equipment or digitized radar equipment.

REFERENCE-
P/CG Term- Radar Weather Echo Intensity Levels.

d. The supervisory traffic management coordinator-in-charge/operations supervisor/controller-in-charge shall verify the digitized radar weather information by the best means available (e.g., pilot reports, local tower personnel, etc.) if the weather data displayed by digitized radar is reported as questionable or erroneous. Errors in weather radar presentation shall be reported to the AF technician and the AT supervisor shall determine if the digitized radar derived weather data is to be displayed and a NOTAM distributed.

NOTE-
Anomalous propagation (AP) is a natural occurrence affecting radar and does not in itself constitute a weather circuit failure.

2-6-5. CALM WIND CONDITIONS

TERMINAL. Describe the wind as calm when the wind velocity is less than three knots.

REFERENCE-
FAAO 7110.65, Tailwind Components, Para 3-5-3.
FAAO 7110.65, Intersecting Runway Separation, Para 3-10-4.

2-6-6. REPORTING WEATHER CONDITIONS

a. When the prevailing visibility at the usual point of observation, or at the tower level, is less than 4 miles, tower personnel shall take prevailing visibility observations and apply the observations as follows:

1. Use the lower of the two observations (tower or surface) for aircraft operations.

2. Forward tower visibility observations to the weather observer.

3. Notify the weather observer when the tower observes the prevailing visibility decrease to less than 4 miles or increase to 4 miles or more.

b. Forward current weather changes to the appropriate control facility as follows:

1. When the official weather changes to a condition which is below 1,000-foot ceiling or below the highest circling minimum, whichever is greater, or less than 3 miles visibility, and when it improves to a condition which is better than those above.

2. Changes which are classified as special weather observations during the time that weather conditions are below 1,000-foot ceiling or the highest circling minimum, whichever is greater, or less than 3 miles visibility.

c. Towers at airports where military turbo-jet en route descents are routinely conducted shall also report the conditions to the ARTCC even if it is not the controlling facility.

d. If the receiving facility informs you that weather reports are not required for a specific time period, discontinue the reports. The time period specified should not exceed the duration of the receiving controller's tour of duty.

e. *EN ROUTE.* When you determine that weather reports for an airport will not be required for a specific time period, inform the FSS or tower of this determination. The time period specified should not exceed the duration of receiving controller's tour of duty.

REFERENCE-
FAAO 7110.65, Forwarding Approach Information by Nonapproach Control Facilities, Para 3-10-2.

2-6-7. DISSEMINATING WEATHER INFORMATION

TERMINAL. Observed elements of weather information shall be disseminated as follows:

a. General weather information, such as "large breaks in the overcast," "visibility lowering to the south," or similar statements which do not include specific values, and any elements derived directly from instruments, pilots, or radar may be transmitted to pilots or other ATC facilities without consulting the weather reporting station.

b. Specific values, such as ceiling and visibility, may be transmitted if obtained by one of the following means:

1. You are properly certificated and acting as official weather observer for the elements being reported.

NOTE-
USAF controllers do not serve as official weather observers.

2. You have obtained the information from the official observer for the elements being reported.

3. The weather report was composed or verified by the weather station.

4. The information is obtained from an official Automated Weather Observation System (AWOS) or an Automated Surface Observation System (ASOS).

c. Differences between weather elements observed from the tower and those reported by the weather station shall be reported to the official observer for the element concerned.

Section 9. Automatic Terminal Information Service Procedures

2-9-1. APPLICATION

Use the ATIS, where available, to provide advance noncontrol airport/terminal area and meteorological information to aircraft.

a. Identify each ATIS message by a phonetic letter code word at both the beginning and the end of the message. Automated systems will have the phonetic letter code automatically appended. Exceptions may be made where omissions are required because of special programs or equipment.

1. Each alphabet letter phonetic word shall be used sequentially, except as authorized in subpara a2, beginning with "Alpha," ending with "Zulu," and repeated without regard to the beginning of a new day. Identify the first resumed broadcast message with "Alpha" or the first assigned alphabet letter word in the event of a broadcast interruption of more than 12 hours.

2. Specific sequential portions of the alphabet may be assigned between facilities or an arrival and departure ATIS when designated by a letter of agreement or facility directive.

REFERENCE-
FAAO 7210.3, Automatic Terminal Information Service (ATIS), Para 10-4-1.

b. The ATIS recording shall be reviewed for completeness, accuracy, speech rate, and proper enunciation before being transmitted.

c. Arrival and departure messages, when broadcast separately, need only contain information appropriate for that operation.

2-9-2. OPERATING PROCEDURES

Maintain an ATIS message that reflects the most current arrival and departure information.

a. Make a new recording when any of the following occur:

1. Upon receipt of any new official weather regardless of whether there is or is not a change in values.

2. When runway braking action reports are received that indicate runway braking is worse than that which is included in the current ATIS broadcast.

3. When there is a change in any other pertinent data, such as runway change, instrument approach in use, new or canceled NOTAM's/PIREP's/HIWAS update, etc.

b. When a pilot acknowledges that he/she has received the ATIS broadcast, controllers may omit those items contained in the broadcasts if they are current. Rapidly changing conditions will be issued by ATC, and the ATIS will contain the following:

EXAMPLE-
"Latest ceiling/visibility/altimeter/wind/(other conditions) will be issued by approach control/tower."

c. Broadcast on all appropriate frequencies to advise aircraft of a change in the ATIS code/message.

d. Controllers shall ensure that pilots receive the most current pertinent information. Ask the pilot to confirm receipt of the current ATIS information if the pilot does not initially state the appropriate ATIS code. Controllers shall ensure that changes to pertinent operational information is provided after the initial confirmation of ATIS information is established. Issue the current weather, runway in use, approach information, and pertinent NOTAM's to pilots who are unable to receive the ATIS.

EXAMPLE-
"Verify you have information ALPHA."

"Information BRAVO now current, visibility three miles."

"Information CHARLIE now current, Ceiling 1500 Broken."

2-9-3. CONTENT

Include the following in ATIS broadcast as appropriate:

a. Airport/facility name, phonetic letter code, time of weather sequence (UTC). Weather information consisting of wind direction and velocity, visibility, obstructions to vision, present weather, sky condition, temperature, dew point, altimeter, a density altitude advisory when appropriate and other pertinent remarks included in the official weather observation. Wind direction, velocity, and altimeter shall be reported from certified direct reading instruments. Temperature and dew point should be reported from certified direct reading sensors when available. Always include weather observation remarks of lightning, cumulonimbus, and towering cumulus clouds.

NOTE-
ASOS/AWOS is to be considered the primary source of wind direction, velocity, and altimeter data at those locations that are so equipped. The ASOS Operator Interface Device (OID) displays the magnetic wind as "MAG WND" in the auxiliary data location in the lower left hand portion of the screen. Other OID displayed winds are true and are not to be used for operational purposes.

b. The ceiling/sky condition, visibility, and obstructions to vision may be omitted if the ceiling is above 5,000 feet and the visibility is more than 5 miles.

EXAMPLE-
A remark may be made, "The weather is better than five thousand and five."

c. Instrument/visual approach/s in use. Specify landing runway/s unless the runway is that to which the instrument approach is made.

d. Departure runway/s (to be given only if different from landing runway/s or in the instance of a "departure only" ATIS).

e. Taxiway closures which affect the entrance or exit of active runways, other closures which impact airport operations, other NOTAM's and PIREP's pertinent to operations in the terminal area. Inform pilots of where hazardous weather is occurring and how the information may be obtained. Include available information of known bird activity.

REFERENCE-
FAAO 7110.65, Bird Activity Information, Para 2-1-22.

f. Runway braking action or friction reports when provided. Include the time of the report and a word describing the cause of the runway friction problem.

PHRASEOLOGY-
RUNWAY (number) MU (first value, second value, third value) AT (time), (cause).

EXAMPLE-
"Runway Two Seven, MU forty-two, forty-one, twenty-eight at one zero one eight Zulu, ice."

REFERENCE-
FAAO 7110.65, Braking Action Advisories, Para 3-3-5.

g. Other optional information as local conditions dictate in coordination with ATC. This may include such items as VFR arrival frequencies, temporary airport conditions, LAHSO operations being conducted, or other perishable items that may appear only for a matter of hours or a few days on the ATIS message.

h. Low level wind shear (LLWS) when reported by pilots or is detected on a low level wind shear alert system (LLWAS).

REFERENCE-
FAAO 7110.65, Low Level Wind Shear Advisories, Para 3-1-8.

i. A statement which advises the pilot to read back instructions to hold short of a runway. The air traffic manager may elect to remove this requirement 60 days after implementation provided that removing the statement from the ATIS does not result in increased requests from aircraft for read back of hold short instructions.

j. Instructions for the pilot to acknowledge receipt of the ATIS message by informing the controller on initial contact.

EXAMPLE-
"Boston Tower Information Delta. One four zero zero Zulu. Wind two five zero at one zero. Visibility one zero. Ceiling four thousand five hundred broken. Temperature three four. Dew point two eight. Altimeter three zero one zero. ILS-DME Runway Two Seven Approach in use. Departing Runway Two Two Right. Hazardous Weather Information for (geographical area) available on HIWAS, Flight Watch, or Flight Service Frequencies. Advise on initial contact you have Delta."

Chapter 3. Airport Traffic Control- Terminal

Section 1. General

3-1-1. PROVIDE SERVICE

Provide airport traffic control service based only upon observed or known traffic and airport conditions.

NOTE-
When operating in accordance with CFR's, it is the responsibility of the pilot to avoid collision with other aircraft. However, due to the limited space around terminal locations, traffic information can aid pilots in avoiding collision between aircraft operating within Class B, Class C, or Class D surface areas and the terminal radar service areas, and transiting aircraft operating in proximity to terminal locations.

3-1-2. PREVENTIVE CONTROL

Provide preventive control service only to aircraft operating in accordance with a letter of agreement. When providing this service, issue advice or instructions only if a situation develops which requires corrective action.

NOTE-
Preventive control differs from other airport traffic control in that repetitious, routine approval of pilot action is eliminated. Controllers intervene only when they observe a traffic conflict developing.

3-1-3. USE OF ACTIVE RUNWAYS

The local controller has primary responsibility for operations conducted on the active runway and must control the use of those runways. Positive coordination and control is required as follows:

NOTE-
Exceptions may be authorized only as provided in para 1-1-9, Constraints Governing Supplements and Procedural Deviations, and FAAO 7210.3, Use of Active Runways, para 10-1-7, where justified by extraordinary circumstances at specific locations.

REFERENCE-
FAAO 7110.65, Constraints Governing Supplements and Procedural Deviations, Para 1-1-9.
FAAO 7210.3, Use of Active Runways, Para 10-1-7.

a. Ground control must obtain approval from local control before authorizing an aircraft or a vehicle to cross or use any portion of an active runway. The coordination shall include the point/intersection at the runway where the operation will occur.

PHRASEOLOGY-
CROSS (runway) AT (point/intersection).

b. When the local controller authorizes another controller to cross an active runway, the local controller shall verbally specify the runway to be crossed and the point/intersection at the runway where the operation will occur preceded by the word "cross."

PHRASEOLOGY-
CROSS (runway) AT (point/intersection).

c. The ground controller shall advise the local controller when the coordinated runway operation is complete. This may be accomplished verbally or through visual aids as specified by a facility directive.

d. *USA/USAF NOT APPLICABLE.* Authorization for aircraft/vehicles to taxi/proceed on or along an active runway, for purposes other than crossing, shall be provided via direct communications on the appropriate local control frequency. This authorization may be provided on the ground control frequency after coordination with local control is completed for those operations specifically described in a facility directive.

NOTE-
The USA and USAF establish local operating procedures in accordance with USA and USAF directives.

e. The local controller shall coordinate with the ground controller before using a runway not previously designated as active.

REFERENCE-
FAAO 7110.65, Coordination Between Local and Ground Controllers, Para 3-1-4.

3-1-4. COORDINATION BETWEEN LOCAL AND GROUND CONTROLLERS

Local and ground controllers shall exchange information as necessary for the safe and efficient use of airport runways and movement areas. This may be accomplished via verbal means, flight progress strips, other written information, or automation displays. As a minimum, provide aircraft identification and applicable runway/intersection/taxiway information as follows:

a. Ground control shall notify local control when a departing aircraft has been taxied to a runway other than one previously designated as active.

REFERENCE-
FAAO 7110.65, Use of Active Runways, Para 3-1-3.
FAAO 7210.3, Selecting Active Runways, Para 10-1-6.

b. Ground control shall notify local control of any aircraft taxied to an intersection for takeoff, unless departure from that intersection is specifically designated via prior coordination or facility directive as the standard operating procedure for the runway to be used. When standard procedures require departures to use a specific intersection, ground control shall notify local control when aircraft are taxied to other portions of the runway for departure.

REFERENCE-
FAAO 7110.65, Wake Turbulence Separation for Intersection Departures, Para 3-9-7.

c. When the runways in use for landing/departing aircraft are not visible from the tower or the aircraft using them are not visible on radar, advise the local/ground controller of the aircraft's location before releasing the aircraft to the other controller.

3-1-5. VEHICLES/EQUIPMENT/PERSONNEL ON RUNWAYS

a. Ensure that the runway to be used is free of all known ground vehicles, equipment, and personnel before a departing aircraft starts takeoff or a landing aircraft crosses the runway threshold.

b. Vehicles, equipment, and personnel in direct communications with the control tower may be authorized to operate up to the edge of an active runway surface when necessary. Provide advisories as specified in para 3-1-6, Traffic Information, and para 3-7-5, Precision Approach Critical Area, as appropriate.

PHRASEOLOGY-
PROCEED AS REQUESTED; AND IF NECESSARY, (additional instructions or information).

NOTE-
Establishing hold lines/signs is the responsibility of the airport manager. Standards for surface measurements, markings, and signs are contained in the following Advisory Circulars; AC 150/5300-13, AC 150/5340-1, AC 150/5340-18 and AC 150/5340-1G. The operator is responsible to properly position the aircraft, vehicle, or equipment at the appropriate hold line/sign or designated point. The requirements in para 3-1-12, Visually Scanning Runways, remain valid as appropriate.

REFERENCE-
FAAO 7110.65, Runway Proximity, Para 3-7-4.
FAAO 7110.65, Touch-and-Go or Stop-and-Go or Low Approach, Para 3-8-2.
FAAO 7110.65, Altitude Restricted Low Approach, Para 3-10-10.
AC 150/5300-13, Airport Design.
AC 150/5340-1G, Standards for Airport Markings.
14 CFR Section 91.129, Operations in Class D Airspace.
AIM, Obstruction Lights, Para 2-2-3.
P/CG Term- Runway in Use/Active Runway/Duty Runway.

3-1-6. TRAFFIC INFORMATION

a. Describe vehicles, equipment, or personnel on or near the movement area in a manner which will assist pilots in recognizing them.

EXAMPLE-
"Mower left of runway two seven."
"Trucks crossing approach end of runway two five."
"Workman on taxiway Bravo."
"Aircraft left of runway one eight."

b. Describe the relative position of traffic in an easy to understand manner, such as "to your right" or "ahead of you."

EXAMPLE-
"Traffic, U.S. Air MD-Eighty on downwind leg to your left."
"King Air inbound from outer marker on straight-in approach to runway one seven."

c. When using a CTRD, you may issue traffic advisories using the standard radar phraseology prescribed in para 2-1-21, Traffic Advisories.

REFERENCE-
FAAO 7110.65, Altitude Restricted Low Approach, Para 3-10-10.

3-1-7. POSITION DETERMINATION

Determine the position of an aircraft before issuing taxi instructions or takeoff clearance.

NOTE-
The aircraft's position may be determined visually by the controller, by pilots, or through the use of the ASDE.

3-1-8. LOW LEVEL WIND SHEAR ADVISORIES

a. When low level wind shear is reported by pilots or detected on any of the Doppler or Low Level Wind Shear Alert Systems (LLWAS), controllers shall issue the alert to all arriving and departing aircraft until the alert is broadcast on the ATIS and pilots indicate they have received the appropriate ATIS code. A statement shall be included on the ATIS for 20 minutes following the last report or indication of wind shear.

REFERENCE-
FAAO 7110.65, PIREP Information, Para 2-6-3.
FAAO 7110.65, Content, Para 2-9-3.
FAAO 7110.65, Landing Information, Para 3-10-1.

PHRASEOLOGY-
LOW LEVEL WIND SHEAR ADVISORIES IN EFFECT.

b. At facilities without ATIS, ensure that wind shear information is broadcast to all arriving and departing aircraft for 20 minutes following the last report or indication of wind shear.

1. At locations equipped with LLWAS, the local controller shall provide wind information as follows:

NOTE-
The LLWAS is designed to detect low level wind shear conditions around the periphery of an airport. It does not detect wind shear beyond that limitation.

REFERENCE-
FAAO 7210.3, Low Level Wind Shear Alert System (LLWAS), Para 10-3-3.

(a) If an alert is received, issue the airport wind and the displayed field boundary wind.

PHRASEOLOGY-
WIND SHEAR ALERT. AIRPORT WIND (direction) AT (velocity). (Location of sensor) BOUNDARY WIND (direction) AT (velocity).

(b) If multiple alerts are received, issue an advisory that there are wind shear alerts in two/several/all quadrants. After issuing the advisory, issue the airport wind in accordance with para 3-9-1, Departure Information, followed by the field boundary wind most appropriate to the aircraft operation.

PHRASEOLOGY-
WIND SHEAR ALERTS TWO/SEVERAL/ALL QUADRANTS. AIRPORT WIND (direction) AT (velocity). (Location of sensor) BOUNDARY WIND (direction) AT (velocity).

(c) If requested by the pilot, issue specific field boundary wind information even though the LLWAS may not be in alert status.

NOTE-
The requirements for issuance of wind information remain valid as appropriate under this paragraph, para 3-9-1, Departure Information and para 3-10-1, Landing Information.

2. LLWAS "Network Expansion" (LLWAS III) and LLWAS systems that are integrated with TDWR, provide the capability of displaying microburst alerts, wind shear alerts and wind information oriented to the threshold or departure end of a runway. TDWR is designed to detect wind shear and microburst activity. The associated ribbon display allows the controller to read the displayed alert without any need for interpretation.

(a) If a wind shear or microburst alert is received for the runway in use, issue the alert information for that runway to arriving and departing aircraft as it is displayed on the ribbon display.

PHRASEOLOGY-
(Runway) (arrival/departure)WIND SHEAR/MICROBURST ALERT, (windspeed) KNOT GAIN/LOSS, (location).

EXAMPLE-
17A MBA 40K - 3MF

PHRASEOLOGY-
RUNWAY 17 ARRIVAL MICROBURST ALERT 40 KNOT LOSS 3 MILE FINAL.

EXAMPLE-
17D WSA 25K+ 2MD

PHRASEOLOGY-
RUNWAY 17 DEPARTURE WIND SHEAR ALERT 25 KNOT GAIN 2 MILE DEPARTURE.

(b) If requested by the pilot or deemed appropriate by the controller, issue the displayed wind information oriented to the threshold or departure end of the runway.

PHRASEOLOGY-
(Runway) DEPARTURE/THRESHOLD WIND (direction) AT (velocity).

(c) Alerts occurring on the edge of the system, or if the system is unable to distinguish between wind shear and microbursts; an alert message will be displayed advising of a possible wind shear outside of the system network.

PHRASEOLOGY-
(Appropriate wind or alert information) POSSIBLE WIND SHEAR OUTSIDE THE NETWORK.

(d) If unstable conditions produce multiple alerts, issue an advisory of multiple wind shear/microburst alerts followed by specific alert or wind information.

PHRASEOLOGY-
MULTIPLE WIND SHEAR/MICROBURST ALERTS (specific alert or wind information).

(e) When a microburst is detected, a statement shall be included on the ATIS broadcast, "MICROBURST ADVISORIES IN EFFECT." This item shall be included on the ATIS for at least 20 MINUTES following the microburst alert.

(f) The LLWAS "Network Expansion" is designed to operate with as many as 50 percent of the total sensors inoperative. When all three remote sensors designated for a specific runway arrival or departure wind display line are inoperative then the LLWAS-NE for that runway arrival/departure shall be considered out of service. When a specific runway arrival or departure wind display line is inoperative and wind shear/microburst activity is likely; (e.g.; frontal

activity, convective storms, PIREP's), a statement shall be included on the ATIS, "WIND SHEAR AND MICROBURST INFORMATION FOR RUNWAY *(runway number)* ARRIVAL/DEPARTURE NOT AVAILABLE."

NOTE-
The geographic situation display (GSD) is a supervisory planning tool and is not intended to be a primary tool for microburst or wind shear alerts.

3-1-9. USE OF TOWER RADAR DISPLAYS

a. Uncertified tower display workstations shall be used only as an aid to assist controllers in visually locating aircraft or in determining their spacial relationship to known geographical points. Radar services and traffic advisories are not to be provided using uncertified tower display workstations. General information may be given in an easy to understand manner, such as "to your right" or "ahead of you."

EXAMPLE-
"Follow the aircraft ahead of you passing the river at the stacks." "King Air passing left to right."

REFERENCE-
FAAO 7210.3, Functional Use of Certified Tower Radar Displays, Para 10-5-3.

b. Local controllers may use certified tower radar displays for the following purposes:

1. To determine an aircraft's identification, exact location, or spatial relationship to other aircraft.

NOTE-
This authorization does not alter visual separation procedures. When employing visual separation, the provisions of para 7-2-1, Visual Separation, apply unless otherwise authorized by AAT-1.

REFERENCE-
FAAO 7110.65, Primary Radar Identification Methods, Para 5-3-2.
FAAO 7110.65, Beacon Identification Methods, Para 5-3-3.
FAAO 7110.65, Terminal Automation Systems Identification Methods, Para 5-3-4.

2. To provide aircraft with radar traffic advisories.

3. To provide a direction or suggested headings to VFR aircraft as a method for radar identification or as an advisory aid to navigation.

PHRASEOLOGY-
(Identification), PROCEED (direction)-BOUND, (other instructions or information as necessary),

or

(identification), SUGGESTED HEADING (degrees), (other instructions as necessary).

NOTE-
It is important that the pilot be aware of the fact that the directions or headings being provided are suggestions or are advisory in nature. This is to keep the pilot from being inadvertently mislead into assuming that radar vectors (and other associated radar services) are being provided when, in fact, they are not.

4. To provide information and instructions to aircraft operating within the surface area for which the tower has responsibility.

EXAMPLE-
"TURN BASE LEG NOW."

NOTE-
Unless otherwise authorized, tower radar displays are intended to be an aid to local controllers in meeting their responsibilities to the aircraft operating on the runways or within the surface area. They are not intended to provide radar benefits to pilots except for those accrued through a more efficient and effective local control position. In addition, local controllers at nonapproach control towers must devote the majority of their time to visually scanning the runways and local area; an assurance of continued positive radar identification could place distracting and operationally inefficient requirements upon the local controller. Therefore, since the requirements of para 5-3-1, Application, cannot be assured, the radar functions prescribed above are not considered to be radar services and pilots should not be advised of being in "radar contact."

c. Additional functions may be performed provided the procedures have been reviewed and authorized by appropriate management levels.

REFERENCE-
FAAO 7110.65, Minima, Para 5-5-4.

3-1-10. OBSERVED ABNORMALITIES

When requested by a pilot or when you deem it necessary, inform an aircraft of any observed abnormal aircraft condition.

PHRASEOLOGY-
(Item) APPEAR/S (observed condition).

EXAMPLE-
"Landing gear appears up."
"Landing gear appears down and in place."
"Rear baggage door appears open."

3-1-11. SURFACE AREA RESTRICTIONS

a. If traffic conditions permit, approve a pilot's request to cross Class C or Class D surface areas or exceed the Class C or Class D airspace speed limit. Do not, however, approve a speed in excess of 250 knots (288 mph) unless the pilot informs you a higher minimum speed is required.

NOTE-
14 CFR Section 91.117 permits speeds in excess of 250 knots (288 mph) when so required or recommended in the airplane flight manual or required by normal military operating procedures.

REFERENCE-
FAAO 7110.65, Surface Areas, Para 2-1-16.

b. Do not approve a pilot's request or ask a pilot to conduct unusual maneuvers within surface areas of Class B, C, or D airspace if they are not essential to the performance of the flight.

EXCEPTION. A pilot's request to conduct aerobatic practice activities may be approved, when operating in accordance with a letter of agreement, and the activity will have no adverse affect on safety of the air traffic operation or result in a reduction of service to other users.

REFERENCE-
FAAO 7210.3, Aerobatic Practice Areas, Para 5-4-7.

NOTE-
These unusual maneuvers include unnecessary low passes, unscheduled flybys, practice instrument approaches to altitudes below specified minima (unless a landing or touch-and-go is to be made), or any so-called "buzz jobs" wherein a flight is conducted at a low altitude and/or a high rate of speed for thrill purposes. Such maneuvers increase hazards to persons and property and contribute to noise complaints.

3-1-12. VISUALLY SCANNING RUNWAYS

a. Local controllers shall visually scan runways to the maximum extent possible.

b. Ground control shall assist local control in visually scanning runways, especially when runways are in close proximity to other movement areas.

3-1-13. ESTABLISHING TWO-WAY COMMUNICATIONS

Pilots are required to establish two-way radio communications before entering the Class D airspace. If the controller responds to a radio call with, "(a/c call sign) standby," radio communications have been established and the pilot can enter the Class D airspace. If workload or traffic conditions prevent immediate provision of Class D services, inform the pilot to remain outside the Class D airspace until conditions permit the services to be provided.

PHRASEOLOGY-
(A/c call sign) REMAIN OUTSIDE DELTA AIRSPACE AND STANDBY.

REFERENCE-
FAAO 7110.65, Visual Separation, Para 7-2-1.

3-1-14. GROUND OPERATIONS WHEN VOLCANIC ASH IS PRESENT

When volcanic ash is present on the airport surface, and to the extent possible:

a. Avoid requiring aircraft to come to a full stop while taxiing.

b. Provide for a rolling takeoff for all departures.

NOTE-
When aircraft begin a taxi or takeoff roll on ash contaminated surfaces, large amounts of volcanic ash will again become airborne. This newly airborne ash will significantly reduce visibility and will be ingested by the engines of following aircraft.

REFERENCE-
AIM, Flight Operations in Volcanic Ash, Para 7-5-8.

Section 6. Airport Surface Detection Procedures

3-6-1. EQUIPMENT USAGE

a. ASDE/AMASS shall be operated continuously to augment visual observation of aircraft landing or departing, and aircraft or vehicular movements on runways and taxiways, or other areas of the movement area.

b. The operational status of ASDE/AMASS shall be determined during the relief briefing, or as soon as possible after assuming responsibility for the associated control position.

3-6-2. INFORMATION USAGE

a. ASDE/AMASS derived information may be used to:

1. Formulate clearances and control instructions to aircraft.

2. Formulate control instructions to vehicles on the movement area.

REFERENCE-
FAAO 7210.3, Radar Use, Para 3-7-2b2.

3. Position aircraft and vehicles using the movement area.

4. Determine the exact location of aircraft and vehicles, or spatial relationship to other aircraft/vehicles on the movement area.

5. Monitor compliance with control instructions by aircraft and vehicles on taxiways and runways.

6. Confirm pilot reported positions.

7. Provide directional taxi information, as appropriate.

PHRASEOLOGY-
TURN (left/right) ON THE TAXIWAY/RUNWAY YOU ARE APPROACHING.

b. Do not provide specific navigational guidance (exact headings to be followed) unless an emergency exists or by mutual agreement with the pilot.

NOTE-
It remains the pilot's responsibility to navigate visually via routes to the clearance limit specified by the controller and to avoid other parked or taxiing aircraft, vehicles, or persons in the movement area.

3-6-3. IDENTIFICATION

To identify an observed target on the ASDE/AMASS display, correlate its position with one or more of the following:

a. Pilot position report.

b. Controller's visual observation.

c. An identified target observed on the ASR or BRITE/DBRITE/TDW display.

3-6-4. AMASS ALERT RESPONSES

When the system alarms, the controller shall immediately assess the situation visually and as presented on the ASDE/AMASS display, then take appropriate action, as follows:

a. When an arrival aircraft (still airborne, prior to the landing threshold) activates an alarm, the controller shall issue go-around instructions. (Exception: Alarms involving known formation flights, as they cross the landing threshold, may be disregarded if all other factors are acceptable.)

b. For other AMASS alarms, issue instructions/clearances based on good judgment and evaluation of the situation at hand.

e. Issue progressive taxi/ground movement instructions when:

1. Pilot/operator requests.

2. The specialist deems it necessary due to traffic or field conditions, e.g., construction or closed taxiways.

3. As necessary during reduced visibility, especially when the taxi route is not visible from the tower.

f. Progressive ground movement instructions include step-by-step routing directions.

REFERENCE-
FAAO 7110.65, Runway Proximity, Para 3-7-4.
FAAO 7110.65, Taxi and Ground Movement Operation, Para 3-11-1.

g. Instructions to expedite a taxiing aircraft or a moving vehicle.

PHRASEOLOGY-
TAXI WITHOUT DELAY (traffic if necessary).

EXIT/PROCEED/CROSS
(runway/taxiway) WITHOUT DELAY.

3-7-3. GROUND OPERATIONS

WAKE TURBULENCE APPLICATION

Avoid clearances which require:

a. Heavy jet aircraft to use greater than normal taxiing power.

b. Small aircraft or helicopters to taxi in close proximity to taxiing or hover-taxi helicopters.

REFERENCE-
AC 90-23, Aircraft Wake Turbulence, Para 10 and Para 11.

3-7-4. RUNWAY PROXIMITY

Hold a taxiing aircraft or vehicle clear of the runway as follows:

a. Instruct aircraft or vehicle to hold short of a specific runway.

b. Instruct aircraft or vehicle to hold at a specified point.

c. Issue traffic information as necessary.

PHRASEOLOGY-
HOLD SHORT OF/AT (runway number or specific point), (traffic or other information).

NOTE-
Establishing hold lines/signs is the responsibility of the airport manager. The standards for surface measurements, markings, and signs are contained in AC 150/5300-13, Airport Design; AC 150/5340-1, Standards for Airport Markings, and AC 150/5340-18, Standards for Airport Sign Systems. The operator is responsible for properly positioning the aircraft, vehicle, or equipment at the appropriate hold line/sign or designated point. The requirements in para 3-1-12, Visually Scanning Runways, remain valid as appropriate.

REFERENCE-
FAAO 7110.65, Taxi and Ground Movement Operations, Para 3-7-2.
FAAO 7110.65, Altitude Restricted Low Approach, Para 3-10-10.
FAAO 7110.65, Vehicles/Equipment/Personnel on Runways, Para 3-1-5.

3-7-5. PRECISION APPROACH CRITICAL AREA

a. ILS critical area dimensions are described in FAAO 6750.16, Siting Criteria for Instrument Landing Systems. Aircraft and vehicle access to the ILS/MLS critical area must be controlled to ensure the integrity of ILS/MLS course signals whenever conditions are less than reported ceiling 800 feet and/or visibility less than 2 miles. Do not authorize vehicles/aircraft to operate in or over the critical area, except as specified in subpara a1, whenever an arriving aircraft is inside the ILS outer marker (OM) or the fix used in lieu of the OM unless the arriving aircraft has reported the runway in sight or is circling to land on another runway.

PHRASEOLOGY-
HOLD SHORT OF (runway) ILS/MLS CRITICAL AREA.

1. LOCALIZER CRITICAL AREA

(a) Do not authorize vehicle or aircraft operations in or over the area when an arriving aircraft is inside the ILS OM or the fix used in lieu of the OM when conditions are less than reported ceiling 800 feet and/or visibility less than 2 miles, except:

(1) A preceding arriving aircraft on the same or another runway that passes over or through the area while landing or exiting the runway.

(2) A preceding departing aircraft or missed approach on the same or another runway that passes through or over the area.

(b) In addition to subpara a1(a), do not authorize vehicles or aircraft operations in or over the area when an arriving aircraft is inside the middle marker when conditions are less than reported ceiling 200 feet and/or RVR 2,000 feet.

2. GLIDESLOPE CRITICAL AREA. Do not authorize vehicles or aircraft operations in or over the area when an arriving aircraft is inside the ILS OM or

the fix used in lieu of the OM unless the arriving aircraft has reported the runway in sight or is circling to land on another runway when conditions are less than reported ceiling 800 feet and/or visibility less than 2 miles.

b. Air carriers commonly conduct "coupled" or "autoland" operations to satisfy maintenance, training, or reliability program requirements. Promptly issue an advisory if the critical area will not be protected when an arriving aircraft advises that a "coupled," "CATIII," "autoland," or similar type approach will be conducted and the weather is reported ceiling of 800 feet or more, and the visibility is 2 miles or more.

PHRASEOLOGY-
ILS/MLS CRITICAL AREA NOT PROTECTED.

c. The Department of Defense (DOD) is authorized to define criteria for protection of precision approach critical areas at military controlled airports. This protection is provided to all aircraft operating at that military controlled airport. Waiver authority for DOD precision approach critical area criteria rests with the appropriate military authority.

NOTE-
Signs and markings are installed by the airport operator to define the ILS/MLS critical area. No point along the longitudinal axis of the aircraft is permitted past the hold line for holding purposes. The operator is responsible to properly position the aircraft, vehicle, or equipment at the appropriate hold line/sign or designated point. The requirements in para 3-1-12, Visually Scanning Runways, remain valid as appropriate.

REFERENCE-
AC150/5340-1, Standards for Airport Markings.

Section 9. Departure Procedures and Separation

3-9-1. DEPARTURE INFORMATION

Provide current departure information, as appropriate, to departing aircraft.

a. Departure information contained in the ATIS broadcast may be omitted if the pilot states the appropriate ATIS code.

b. Issue departure information by including the following:

1. Runway in use. (May be omitted if pilot states "have the numbers.")

2. Surface wind from direct readout dial, LLWAS, or automated weather observing system information display. (May be omitted if pilot states "have the numbers.")

3. Altimeter setting. (May be omitted if pilot states "have the numbers.")

REFERENCE-
FAAO 7110.65, Current Settings, Para 2-7-1.

c. Time, when requested.

d. Issue the official ceiling and visibility, when available, to a departing aircraft before takeoff as follows:

1. To a VFR aircraft when weather is below VFR conditions.

2. To an IFR aircraft when weather is below VFR conditions or highest takeoff minima, whichever is greater.

NOTE-
Standard takeoff minimums are published in 14 CFR Section 91.175(f). Takeoff minima other than standard are prescribed for specific airports/runways and published in a tabular form supplement to the NOS Instrument Approach Procedures Charts and appropriate FAA Forms 8260.

e. Taxi information, as necessary. You need not issue taxi route information unless the pilot specifically requests it.

f. *USAF NOT APPLICABLE.* An advisory to "check density altitude" when appropriate.

REFERENCE-
FAAO 7210.3, Broadcast Density Altitude Advisory, Para 2-10-6.

g. Issue braking action for the runway in use as received from pilots or the airport management when Braking Action Advisories are in effect.

REFERENCE-
FAAO 7110.65, Altimeter Setting Issuance Below Lowest Usable FL, Para 2-7-2.
FAAO 7110.65, Low Level Wind Shear Advisories, Para 3-1-8.
FAAO 7110.65, Braking Action Advisories, Para 3-3-5.
P/CG Term- Braking Action Advisories.

3-9-2. DEPARTURE DELAY INFORMATION

USA/USAF/USN NOT APPLICABLE

When gate-hold procedures are in effect, issue the following departure delay information as appropriate:

REFERENCE-
FAAO 7210.3, Gate Hold Procedures, Para 10-4-3.

a. Advise departing aircraft the time at which the pilot can expect to receive engine startup advisory.

PHRASEOLOGY-
GATE HOLD PROCEDURES ARE IN EFFECT. ALL AIRCRAFT CONTACT (position) ON (frequency) FOR ENGINE START TIME. EXPECT ENGINE START/TAXI (time).

b. Advise departing aircraft when to start engines and/or to advise when ready to taxi.

PHRASEOLOGY-
START ENGINES, ADVISE WHEN READY TO TAXI,

or

ADVISE WHEN READY TO TAXI.

c. If the pilot requests to hold in a delay absorbing area, the request shall be approved if space and traffic conditions permit.

d. Advise all aircraft on GC/FD frequency upon termination of gate hold procedures.

PHRASEOLOGY-
GATE HOLD PROCEDURES NO LONGER IN EFFECT.

3-9-3. DEPARTURE CONTROL INSTRUCTIONS

Inform departing IFR, SVFR, VFR aircraft receiving radar service, and TRSA VFR aircraft of the following:

a. Before takeoff.

1. Issue the appropriate departure control frequency and beacon code. The departure control frequency may be omitted if a DP has been or will be assigned and the departure control frequency is published on the DP.

PHRASEOLOGY-
DEPARTURE FREQUENCY WILL BE (frequency), SQUAWK (code).

2. Inform all departing IFR military turboprop/turbojet aircraft (except transport and cargo types) to change to departure control frequency. If the local controller has departure frequency override, transmit urgent instructions on this frequency. If the override capability does not exist, transmit urgent instructions on the emergency frequency.

PHRASEOLOGY-
CHANGE TO DEPARTURE.

3. *USAF.* USAF control towers are authorized to inform all departing IFR military transport/cargo type aircraft operating in formation flight to change to departure control frequency before takeoff.

b. After takeoff.

1. When the aircraft is about $^1/_2$ mile beyond the runway end, instruct civil aircraft, and military transport, and cargo types to contact departure control, provided further communication with you is not required.

2. Do not request departing military turboprop/turbojet aircraft (except transport and cargo types) to make radio frequency or radar beacon changes before the aircraft reaches 2,500 feet above the surface.

REFERENCE-
FAAO 7110.65, Visual Separation, Para 7-2-1.

3-9-4. TAXI INTO POSITION AND HOLD (TIPH)

a. The intent of TIPH is to position aircraft for an imminent departure. Authorize an aircraft to taxi into position and hold, except as restricted in subpara f, when takeoff clearance cannot be issued because of traffic. Issue traffic information to any aircraft so authorized. Traffic information may be omitted when the traffic is another aircraft which has landed on or is taking off the same runway and is clearly visible to the holding aircraft. Do not use conditional phrases such as "behind landing traffic" or "after the departing aircraft."

b. *USN NOT APPLICABLE.* First state the runway number followed by the taxi into position clearance when more than one runway is active.

PHRASEOLOGY-
RUNWAY (number), TAXI INTO POSITION AND HOLD.

Or, when only one runway is active:

TAXI INTO POSITION AND HOLD.

c. When an aircraft is authorized to taxi into takeoff position to hold, inform it of the closest traffic that is cleared to land, touch-and-go, stop-and-go, or unrestricted low approach on the same runway.

EXAMPLE-
"United Five, runway one eight, taxi into position and hold. Traffic a Boeing Seven Thirty Seven, six mile final."

Or, when only one runway is active:

"United Five, taxi into position and hold. Traffic a Boeing Seven Thirty Seven, six mile final."

d. *USAF.* When an aircraft is authorized to taxi into takeoff position to hold, inform it of the closest traffic within 6 miles on final approach to the same runway. If the approaching aircraft is on a different frequency, inform it of the aircraft taxing into position.

e. Do not authorize an aircraft to taxi into position and hold when the departure point is not visible from the tower, unless the aircraft's position can be verified by ASDE or the runway is used for departures only.

f. Do not authorize an aircraft to taxi into position and hold at an intersection between sunset and sunrise or at anytime when the intersection is not visible from the tower.

g. *USN.* Do not authorize aircraft to taxi into takeoff position to hold simultaneously on intersecting runways.

PHRASEOLOGY-
CONTINUE HOLDING,

or

TAXI OFF THE RUNWAY.

REFERENCE-
FAAO 7110.65, Altitude Restricted Low Approach, Para 3-10-10.

h. When a local controller delivers or amends an ATC clearance to an aircraft awaiting departure and that aircraft is holding short of a runway or is holding in position on a runway, an additional clearance shall be issued to prevent the possibility of the aircraft inadvertently taxiing onto the runway and/or beginning takeoff

roll. In such cases, append one of the following ATC instructions as appropriate:

1. HOLD SHORT OF RUNWAY, *or*

2. HOLD IN POSITION.

i. *USAF/USN.* When issuing additional instructions or information to an aircraft holding in takeoff position, include instructions to continue holding or taxi off the runway, unless it is cleared for takeoff.

PHRASEOLOGY-
CONTINUE HOLDING,

or

TAXI OFF THE RUNWAY.

REFERENCE-
FAAO 7110.65, Altitude Restricted Low Approach, Para 3-10-10.

3-9-5. ANTICIPATING SEPARATION

Takeoff clearance needs not be withheld until prescribed separation exists if there is a reasonable assurance it will exist when the aircraft starts takeoff roll.

3-9-6. SAME RUNWAY SEPARATION

Separate a departing aircraft from a preceding departing or arriving aircraft using the same runway by ensuring that it does not begin takeoff roll until:

a. The other aircraft has departed and crossed the runway end or turned to avert any conflict. If you can determine distances by reference to suitable landmarks, the other aircraft needs only be airborne if the following minimum distance exists between aircraft:
(See FIG 3-9-1 and FIG 3-9-2.)

1. When only Category I aircraft are involved- *3,000 feet.*

2. When a Category I aircraft is preceded by a Category II aircraft- *3,000 feet.*

3. When either the succeeding or both are Category II aircraft- *4,500 feet.*

4. When either is a Category III aircraft- *6,000 feet.*

5. When the succeeding aircraft is a helicopter, visual separation may be applied in lieu of using distance minima.

Same Runway Separation
[View 1]

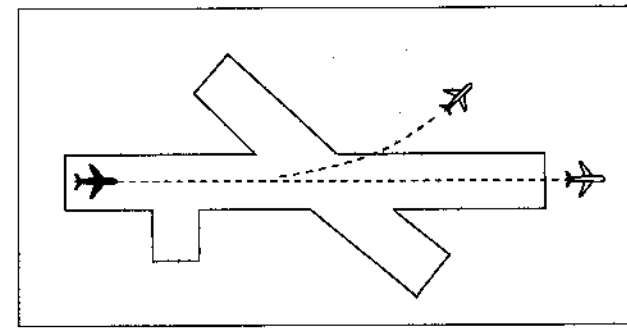


FIG 3-9-1

Same Runway Separation
[View 2]

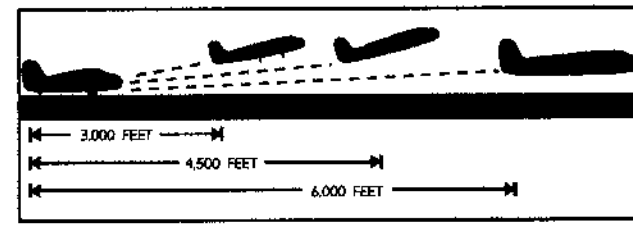


FIG 3-9-2

NOTE-
Aircraft same runway separation (SRS) categories are specified in Appendices A, B, and C and based upon the following definitions:

CATEGORY I- small aircraft weighing 12,500 lbs. or less, with a single propeller driven engine, and all helicopters.

CATEGORY II- small aircraft weighing 12,500 lbs. or less, with propeller driven twin-engines.

CATEGORY III- all other aircraft.

b. A preceding landing aircraft is clear of the runway.
(See FIG 3-9-3.)

Preceding Landing Aircraft Clear of Runway

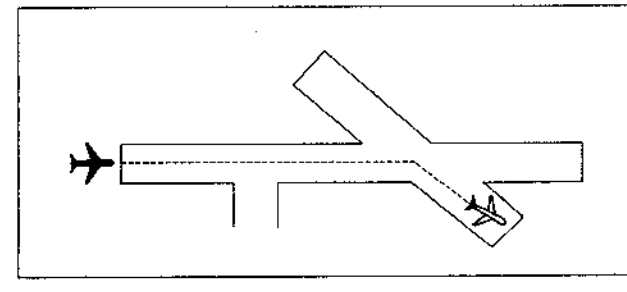


FIG 3-9-3

REFERENCE-
P/CG Term- Clear of the Runway.

WAKE TURBULENCE APPLICATION

c. Do not issue clearances which imply or indicate approval of rolling takeoffs by heavy jet aircraft except as provided in para 3-1-14, Ground Operations When Volcanic Ash is Present.

d. Do not issue clearances to a small aircraft to taxi into position and hold on the same runway behind a departing heavy jet aircraft to apply the necessary intervals.

REFERENCE-
AC 90-23, Aircraft Wake Turbulence.

e. The minima in para 5-5-3, Minima, may be applied in lieu of the 2 minute requirement in subpara f. When para 5-5-3, Minima, are applied, ensure that the appropriate radar separation exists at or prior to the time an aircraft becomes airborne when taking off behind a heavy jet/B757.

NOTE-
The pilot may request additional separation; i.e., 2 minutes vs. 4 miles, but should make this request before taxiing on the runway.

f. Separate IFR/VFR aircraft taking off behind a heavy jet/B757 departure by 2 minutes, when departing:

NOTE-
Takeoff clearance to the following aircraft should not be issued until 2 minutes after the heavy jet/B757 begins takeoff roll.

1. The same runway. (See FIG 3-9-4.)

2 Minute Separation

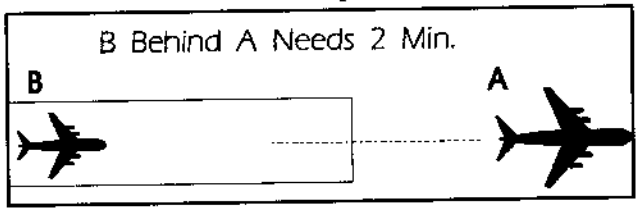


FIG 3-9-4

2. A parallel runway separated by less than 2,500 feet.

g. Separate an aircraft from a heavy jet/B757 when operating on a runway with a displaced landing threshold if projected flight paths will cross- *2 minutes when:*

1. A departure follows a heavy jet/B757 arrival.
2. An arrival follows a heavy jet/B757 departure.

h. Air traffic controllers shall not approve pilot requests to deviate from the required wake turbulence time interval if the preceding aircraft is a heavy jet/B757.

i. Separate a small aircraft behind a large aircraft taking off or making a low/missed approach when utilizing opposite direction takeoffs on the same runway by *3 minutes* unless a pilot has initiated a request to deviate from the 3-minute interval. In the latter case, issue a wake turbulence advisory before clearing the aircraft for takeoff.

NOTE-
1. A request for takeoff does not initiate a waiver request.
2. To initiate a waiver of the 3 minute rule, the request for takeoff must be accompanied by a request to deviate from the 3-minute rule.

REFERENCE-
FAAO 7110.65, Aircraft Information: Appendix A, Appendix B, and Appendix C.

j. Separate aircraft behind a heavy jet/B757 departing or making a low/missed approach when utilizing opposite direction takeoffs or landings on the same or parallel runways separated by less than 2,500 feet- *3 minutes.*

k. Inform an aircraft when it is necessary to hold in order to provide the required *3-minute* interval.

PHRASEOLOGY-
HOLD FOR WAKE TURBULENCE.

REFERENCE-
FAAO 7110.65, Wake Turbulence Separation for Intersection Departures, Para 3-9-7.

3-9-7. WAKE TURBULENCE SEPARATION FOR INTERSECTION DEPARTURES

a. Apply the following wake turbulence criteria for intersection departures:

1. Separate a small aircraft taking off from an intersection on the same runway (same or opposite direction takeoff) or a parallel runway separated by less than 2,500 feet with runway thresholds offset by 500 feet or more behind a preceding departing large aircraft by ensuring that the small aircraft does not start takeoff roll until at least 3 minutes after the large aircraft has taken off.

2. Separate any aircraft taking off from an intersection on the same runway (same or opposite direction takeoff), parallel runways separated by less than 2,500 feet, and parallel runways separated by less than 2,500 feet with runway thresholds offset by 500 feet or more, by ensuring that the aircraft does not start

takeoff roll until at least 3 minutes after a heavy aircraft/B757 has taken off.

NOTE-
Parallel runways separated by less than 2,500 feet with runway thresholds offset by less than 500 feet shall apply para 3-9-6, Same Runway Separation, subpara f.

3. Separate a small aircraft weighing 12,500 lbs. or less taking off from an intersection on the same runway (same or opposite direction takeoff) behind a preceding small aircraft weighing more than 12,500 lbs. by ensuring the following small aircraft does not start takeoff roll until at least 3 minutes after the preceding aircraft has taken off.

4. Inform an aircraft when it is necessary to hold in order to provide the required 3-minute interval.

PHRASEOLOGY-
HOLD FOR WAKE TURBULENCE.

NOTE-
Aircraft conducting touch-and-go and stop-and-go operations are considered to be departing from an intersection.

REFERENCE-
FAAO 7110.65, Touch-and-Go or Stop-and-Go or Low Approach, Para 3-8-2.

b. The 3-minute interval is not required when:

1. A pilot has initiated a request to deviate from that interval unless the preceding departing aircraft is a heavy aircraft/B757.

NOTE-
A request for takeoff does not initiate a waiver request; the request for takeoff must be accomplished by a request to deviate from the 3-minute interval.

2. USA NOT APPLICABLE. The intersection is 500 feet or less from the departure point of the preceding aircraft and both aircraft are taking off in the same direction.

3. Successive touch-and-go and stop-and-go operations are conducted with a small aircraft following another small aircraft weighing more than 12,500 lbs. or a large aircraft in the pattern, or a small aircraft weighing more than 12,500 lbs. or a large aircraft departing the same runway, provided the pilot of the small aircraft is maintaining visual separation/spacing behind the preceding large aircraft. Issue a wake turbulence cautionary advisory and the position of the large aircraft.

EXAMPLE-
"Caution wake turbulence, DC-9 on base leg."

4. Successive touch-and-go and stop-and-go operations are conducted with any aircraft following a heavy aircraft/B757 in the pattern, or heavy aircraft/B757 departing the same runway, provided the pilot of the aircraft is maintaining visual separation/spacing behind the preceding heavy aircraft/B757. Issue a wake turbulence cautionary advisory and the position of the heavy aircraft/B757.

EXAMPLE-
"Caution wake turbulence, heavy Lockheed C5A departing runway two three."

5. If action is initiated to reduce the separation between successive touch-and-go or stop-and-go operations, apply 3 minutes separation.

c. When applying the provision of subpara b:

1. Issue a wake turbulence advisory before clearing the aircraft for takeoff.

2. Do not clear the intersection departure for an immediate takeoff.

3. Issue a clearance to permit the trailing aircraft to deviate from course enough to avoid the flight path of the preceding large departure when applying supara b1 or b2.

4. Separation requirements in accordance with para 3-9-6, Same Runway Separation, must also apply.

REFERENCE-
FAAO 7110.65, Same Runway Separation, Para 3-9-6.

3-9-8. INTERSECTING RUNWAY SEPARATION

Separate departing aircraft from an aircraft using an intersecting runway, or nonintersecting runways when the flight paths intersect, by ensuring that the departure does not begin takeoff roll until one of the following exists:

a. The preceding aircraft has departed and passed the intersection, has crossed the departure runway, or is turning to avert any conflict.
(See FIG 3-9-5 and FIG 3-9-6.)

Intersecting Runway Separation

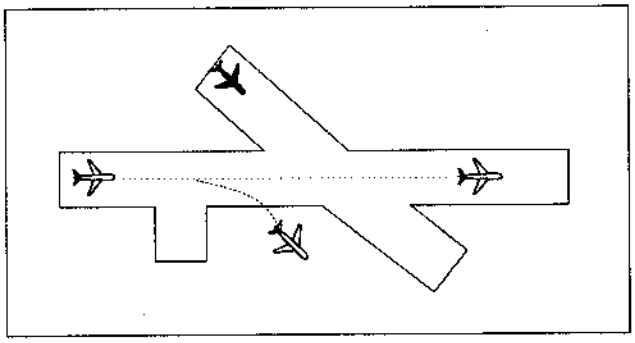


FIG 3-9-5

Intersecting Runway Separation

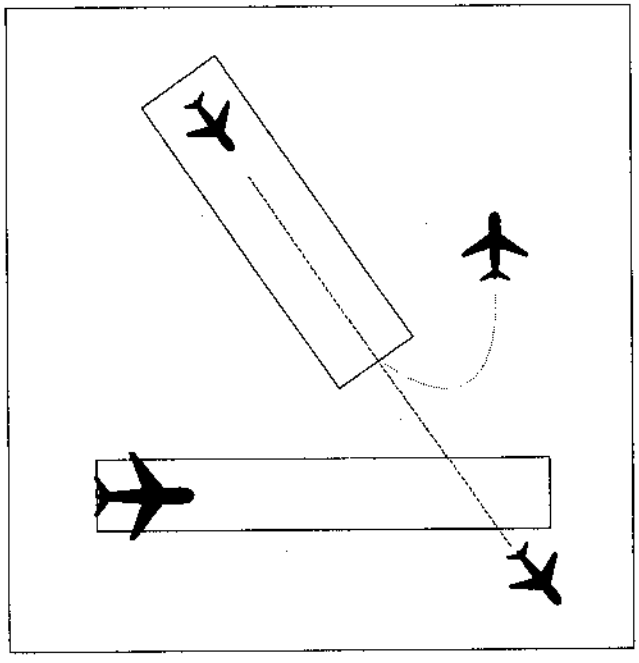


FIG 3-9-6

b. A preceding arriving aircraft is clear of the landing runway, completed the landing roll and will hold short of the intersection, passed the intersection, or has crossed over the departure runway.
(See FIG 3-9-7 and FIG 3-9-8.)

REFERENCE-
P/CG Term- Clear of the Runway.

Intersecting Runway Separation

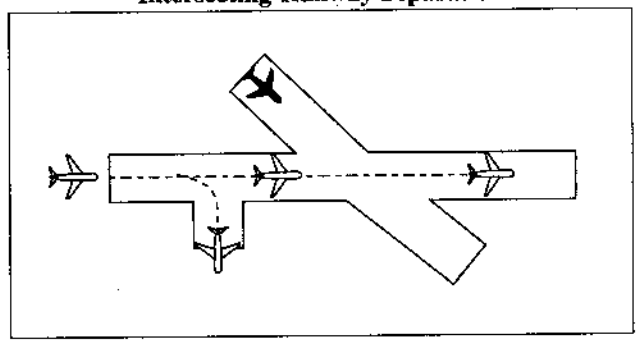


FIG 3-9-7

Intersecting Runway Separation

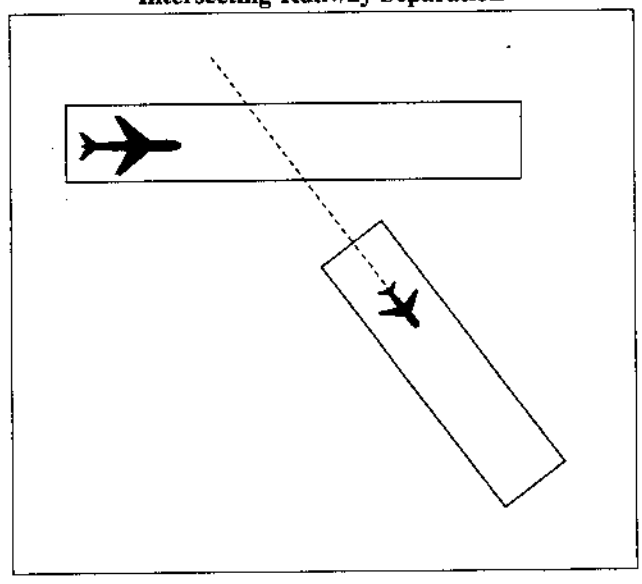


FIG 3-9-8

WAKE TURBULENCE APPLICATION

c. Separate IFR/VFR aircraft taking off behind a heavy jet/B757 departure by *2 minutes* when departing:

NOTE-
Takeoff clearance to the following aircraft should not be issued until 2 minutes after the heavy jet/B757 begins takeoff roll.

1. Crossing runways if projected flight paths will cross. (See FIG 3-9-9.)

2. A parallel runway separated by 2,500 feet or more if projected flight paths will cross.
(See FIG 3-9-10.)

Crossing Runways

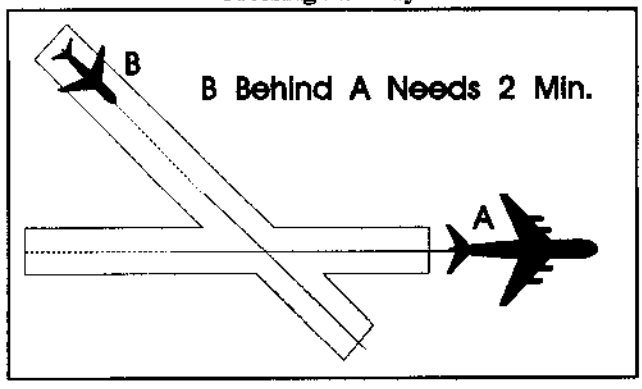


FIG 3-9-9

Parallel Runway

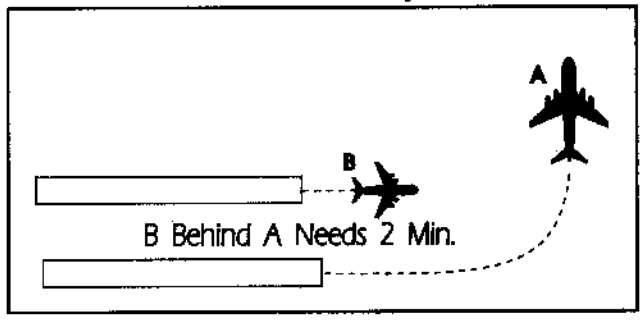


FIG 3-9-10

d. Separate IFR/VFR aircraft departing behind a landing heavy jet/B757 on a crossing runway if the departure will fly through the airborne path of the arrival- *2 minutes.* (See FIG 3-9-11.)

Departure on Crossing Runway

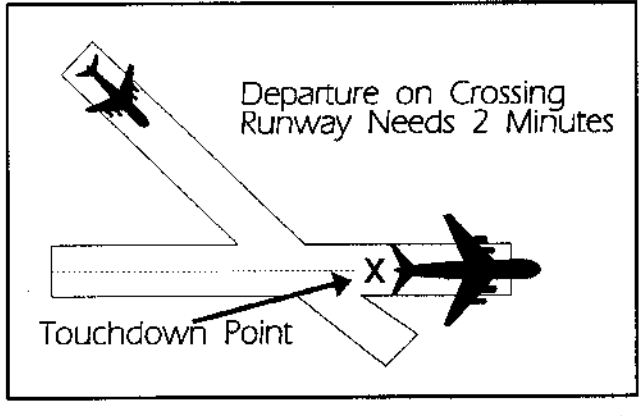


FIG 3-9-11

e. Air traffic controllers shall not approve pilot requests to deviate from the required wake turbulence time interval if the preceding aircraft is a heavy jet/B757.

REFERENCE-
FAAO 7110.65, Successive or Simultaneous Departures, Para 5-8-3.
FAAO 7110.65, Departures and Arrivals on Parallel or Nonintersecting Diverging Runways, Para 5-8-5.

3-9-9. TAKEOFF CLEARANCE

a. When only one runway is active, issue takeoff clearance.

PHRASEOLOGY-
CLEARED FOR TAKEOFF.

NOTE-
Turbine-powered aircraft may be considered ready for takeoff when they reach the runway unless they advise otherwise.

REFERENCE-
FAAO 7110.65, Departure Terminology, Para 4-3-1.

b. When more than one runway is active, first state the runway number followed by the takeoff clearance.

PHRASEOLOGY-
RUNWAY (number), CLEARED FOR TAKEOFF.

EXAMPLE-
"RUNWAY TWO SEVEN, CLEARED FOR TAKEOFF."

c. *USA/USN/USAF.* Issue surface wind and takeoff clearance to aircraft.

PHRASEOLOGY-
WIND (surface wind in direction and velocity).
CLEARED FOR TAKEOFF.

d. *USAF.* When an aircraft is cleared for takeoff, inform it of the closest traffic within 6 miles on final approach to the same runway. If the approaching aircraft is on a different frequency, inform it of the departing aircraft.

3-9-10. CANCELLATION OF TAKEOFF CLEARANCE

Cancel a previously issued clearance for takeoff and inform the pilot of the reason if circumstances require. Once an aircraft has started takeoff roll, cancel the takeoff clearance only for the purpose of safety.

NOTE-
In no case should a takeoff clearance be canceled after an aircraft has started its takeoff roll solely for the purpose of meeting traffic management requirements/EDCT.

PHRASEOLOGY-
CANCEL TAKEOFF CLEARANCE (reason).

WAKE TURBULENCE APPLICATION

c. Separate IFR/VFR aircraft landing behind a departing heavy jet/B757 on a crossing runway if the arrival will fly through the airborne path of the departure- *2 minutes* or the appropriate radar separation minima.
(See FIG 3-10-10.)

Intersecting Runway Separation

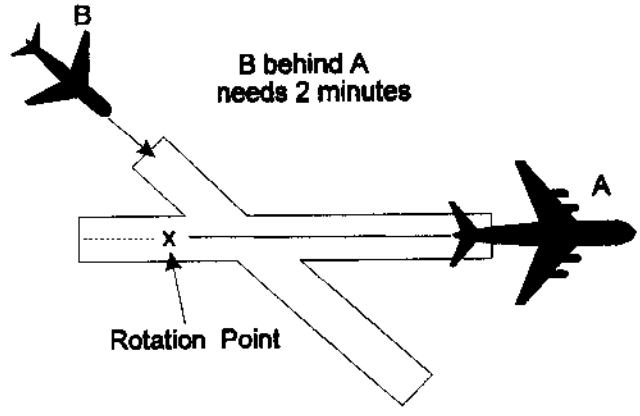


FIG 3-10-10

d. Issue wake turbulence cautionary advisories, the position, altitude if known, and direction of flight of the heavy jet/B757 to:

REFERENCE-
AC 90-23, Aircraft Wake Turbulence, Pilot Responsibility, Para 12.

1. IFR/VFR aircraft landing on crossing runways behind a departing heavy jet/B757; if the arrival flight path will cross the takeoff path behind the heavy jet/B757 and behind the heavy jet/B757 rotation point. (See FIG 3-10-11.)

Intersecting Runway Separation

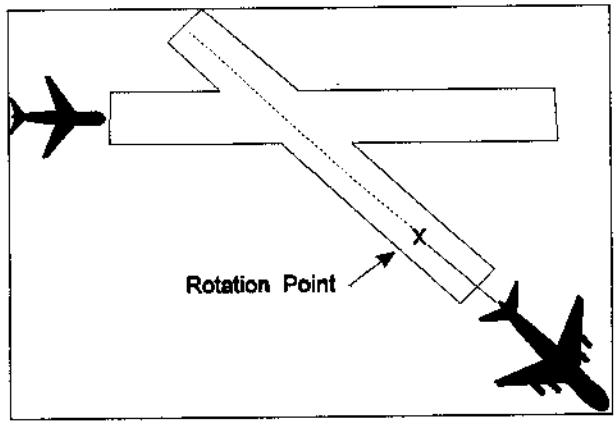


FIG 3-10-11

EXAMPLE-
"Runway niner cleared to land. Caution wake turbulence, heavy C-One Forty One departing runway one five."

2. VFR aircraft landing on a crossing runway behind an arriving heavy jet/B757 if the arrival flight path will cross. (See FIG 3-10-12.)

Intersecting Runway Separation

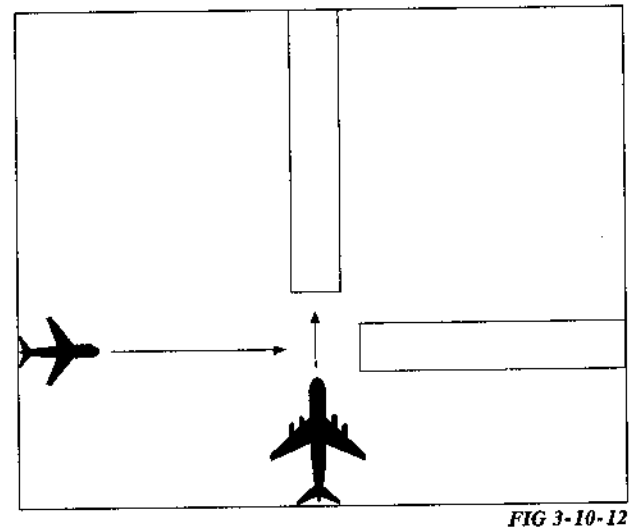


FIG 3-10-12

EXAMPLE-
"Runway niner cleared to land. Caution wake turbulence, Boeing Seven Fifty Seven landing runway three six."

REFERENCE-
FAAO 7110.65, Approaches to Multiple Runways, Para 7-4-4.

3-10-5. LANDING CLEARANCE

a. Issue landing clearance. Restate the landing runway whenever more than one runway is active, or an instrument approach is being conducted to a closed runway.

PHRASEOLOGY-
CLEARED TO LAND,

or

RUNWAY (designator) CLEARED TO LAND.

b. "USN NOT APPLICABLE." Inform the closest aircraft that is cleared to land, touch-and-go, stop-and-go, or unrestricted low approaches when there is traffic holding on the same runway.

EXAMPLE-
"Delta One, cleared to land. Traffic holding in position."

or

"Delta One, runway one eight, cleared to land. Traffic holding in position."

c. *USA/USAF/USN.* Issue surface wind when clearing an aircraft to land, touch-and-go, stop-and-go, low approach, or the option. Restate the landing runway whenever there is a possibility of a conflict with another aircraft which is using or is planning to use another runway.

PHRASEOLOGY-
WIND (surface wind direction and velocity), CLEARED TO LAND,

or

WIND (surface wind direction and velocity), RUNWAY (designator) CLEARED TO LAND.

NOTE-
A clearance to land means that appropriate separation on the landing runway will be ensured. A landing clearance does not relieve the pilot from compliance with any previously issued restriction.

3-10-6. ANTICIPATING SEPARATION

Landing clearance to succeeding aircraft in a landing sequence need not be withheld if you observe the positions of the aircraft and determine that prescribed runway separation will exist when the aircraft cross the landing threshold. Issue traffic information to the succeeding aircraft if not previously reported and appropriate traffic holding in position or departing prior to their arrival.

EXAMPLE-
"American Two Forty-Five cleared to land, number two following United Boeing Seven-Thirty-Seven two mile final, traffic will depart prior to your arrival."

"American Two Forty-Five cleared to land, number two following United Boeing Seven-Thirty-Seven two mile final, traffic will be an MD 88 holding in position."

REFERENCE-
FAAO 7110.65, Closed/Unsafe Runway Information, Para 3-3-2.
FAAO 7110.65, Landing Clearance, Para 3-10-5b, not required if utilizing the provisions of Para 3-10-6.

3-10-7. LANDING CLEARANCE WITHOUT VISUAL OBSERVATION

When an arriving aircraft reports at a position where he/she should be seen but has not been visually observed, advise the aircraft as a part of the landing clearance that it is not in sight and restate the landing runway.

PHRASEOLOGY-
NOT IN SIGHT, RUNWAY (number) CLEARED TO LAND.

NOTE-
Aircraft observance on the CTRD satisfies the visually observed requirement.

3-10-8. WITHHOLDING LANDING CLEARANCE

Do not withhold a landing clearance indefinitely even though it appears a violation of Title 14 of the Code of Federal Regulations has been committed. The apparent violation might be the result of an emergency situation. In any event, assist the pilot to the extent possible.

3-10-9. RUNWAY EXITING

a. Instruct aircraft where to turn-off the runway after landing, when appropriate, and advise the aircraft to hold short of a runway or taxiway if required for traffic.

PHRASEOLOGY-
TURN LEFT/RIGHT (turning point),

or

IF ABLE, TURN LEFT/RIGHT (turning point)

and if required

HOLD SHORT OF (runway).

NOTE-
Runway exiting or taxi instructions should not normally be issued to an aircraft prior to, or immediately after, touchdown.

b. Taxi instructions shall be provided to the aircraft by the local controller when:

1. Compliance with ATC instructions will be required before the aircraft can change to ground control, or

2. The aircraft will be required to enter a taxiway/runway/ramp area, other than the one used to exit the landing runway, in order to taxi clear of the landing runway.

EXAMPLE-
"U.S. Air Ten Forty Two, turn right next taxiway, cross taxiway Bravo, hold short of taxiway Charlie, contact ground point seven."

NOTE-
1. *An aircraft is expected to taxi clear of the runway unless otherwise directed by ATC. Pilots shall not exit the landing runway on to an intersecting runway unless authorized by ATC. In the absence of ATC instructions, an aircraft should taxi clear of the landing runway by clearing the hold position marking associated with the landing runway even if that requires the aircraft to protrude into or enter another taxiway/ramp area. This does not authorize an aircraft to*

cross a subsequent taxiway or ramp after clearing the landing runway.

2. *The pilot is responsible for ascertaining when the aircraft is clear of the runway by clearing the hold position marking associated with the landing runway.*

c. Ground control and local control shall protect a taxiway/runway/ramp intersection if an aircraft is required to enter that intersection to clear the landing runway.

REFERENCE-
FAAO 7210.3, Use of Active Runways, Para 10-1-7.

d. Request a read back of runway hold short instructions when not received from the pilot.

EXAMPLE-
"American Four Ninety-two, turn left at Taxiway Charlie, hold short of Runway 27 Right."

"American Four Ninety Two, Roger."

"American Four Ninety-two, read back hold instructions."

NOTE-
Read back hold instructions phraseology may be initiated for any point on a movement area when the controller believes the read back is necessary.

3-10-10. ALTITUDE RESTRICTED LOW APPROACH

A low approach with an altitude restriction of not less than 500 feet above the airport may be authorized except over an aircraft in takeoff position or a departure aircraft. Do not clear aircraft for restricted altitude low approaches over personnel unless airport authorities have advised these personnel that the approaches will be conducted. Advise the approaching aircraft of the location of applicable ground traffic, personnel, or equipment.

NOTE-
1. *The 500 feet restriction is a minimum. Higher altitudes should be used when warranted. For example, 1,000 feet is more appropriate for heavy aircraft operating over unprotected personnel or small aircraft on or near the runway.*
2. *This authorization includes altitude restricted low approaches over preceding landing or taxiing aircraft. Restricted low approaches are not authorized over aircraft in takeoff position or departing aircraft.*

PHRASEOLOGY-
CLEARED LOW APPROACH AT OR ABOVE (altitude). TRAFFIC (description and location).

REFERENCE-
FAAO 7110.65, Vehicles/Equipment/Personnel on Runways, Para 3-1-5.
FAAO 7110.65, Traffic Information, Para 3-1-6.
FAAO 7110.65, Light Signals, Para 3-2-1.
FAAO 7110.65, Timely Information, Para 3-3-3.
FAAO 7110.65, Taxi into Position and Hold (TIPH), Para 3-9-4.
FAAO 7110.65, Same Runway Separation, Para 3-10-3.

3-10-11. CLOSED TRAFFIC

Approve/disapprove pilot requests to remain in closed traffic for successive operations subject to local traffic conditions.

PHRASEOLOGY-
LEFT/RIGHT (if required) CLOSED TRAFFIC APPROVED. REPORT (position if required),

or

UNABLE CLOSED TRAFFIC, (additional information as required).

NOTE-
Segregated traffic patterns for helicopters to runways and other areas may be established by letter of agreement or other local operating procedures.

REFERENCE-
FAAO 7110.65, Runway Proximity, Para 3-7-4.
FAAO 7110.65, Taxi into Position and Hold (TIPH), Para 3-9-4.
FAAO 7110.65, Same Runway Separation, Para 3-10-3.

3-10-12. OVERHEAD MANEUVER

Issue the following to arriving aircraft that will conduct an overhead maneuver:

a. Pattern altitude and direction of traffic. Omit either or both if standard or when you know the pilot is familiar with a nonstandard procedure.

PHRASEOLOGY-
PATTERN ALTITUDE (altitude). RIGHT TURNS.

b. Request for report on initial approach.

PHRASEOLOGY-
REPORT INITIAL.

c. "Break" information and request for pilot report. Specify the point of "break" only if nonstandard. Request the pilot to report "break" if required for traffic or other reasons.

PHRASEOLOGY-
BREAK AT (specified point).

REPORT BREAK.

d. Overhead maneuver patterns are developed at airports where aircraft have an operational need to conduct the maneuver. An aircraft conducting an overhead maneuver is on VFR and the IFR flight plan is cancelled when the aircraft reaches the "initial point" on the initial approach portion of the maneuver. The existence of a standard overhead maneuver pattern does not eliminate the possible requirement for an aircraft to conform to conventional rectangular patterns if an overhead maneuver cannot be approved.

NOTE-
Aircraft operating to an airport without a functioning control tower must initiate cancellation of the IFR flight plan prior to executing the overhead maneuver or after landing.

Overhead Maneuver

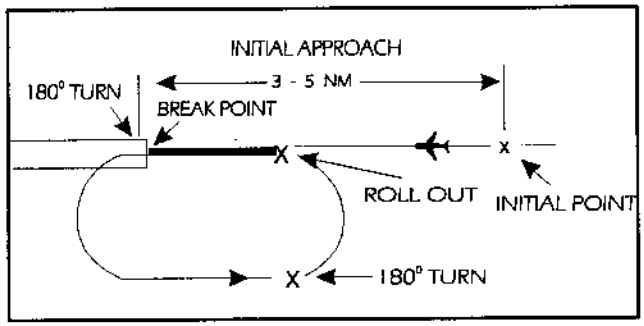


FIG 3-10-13

EXAMPLE-
"Air Force Three Six Eight, Runway Six, wind zero seven zero at eight, pattern altitude six thousand, report initial."

"Air Force Three Six Eight, break at midfield, report break."

"Air Force Three Six Eight, cleared to land."

"Alfa Kilo Two Two, Runway Three One, wind three three zero at one four, right turns, report initial."

"Alfa Kilo Two Two, report break."

"Alfa Kilo Two Two, cleared to land."

e. Timely and positive controller action is required to prevent a conflict when an overhead pattern could extend into the path of a departing or a missed approach aircraft. Local procedures and/or coordination requirements should be set forth in an appropriate letter of agreement, facility directive, base flying manual etc., when the frequency of occurrence warrants.

3-10-13. SIMULATED FLAMEOUT (SFO) APPROACHES/PRACTICE PRECAUTIONARY APPROACHES

a. Authorize military aircraft to make SFO/practice precautionary approaches if the following conditions are met:

1. A letter of agreement or local operating procedure is in effect between the military flying organization and affected ATC facility.

(a) Include specific coordination, execution, and approval procedures for the operation.

(b) The exchange or issuance of traffic information as agreed to in any interfacility letter of agreement is accomplished.

(c) Include a statement in the procedure that clarifies at which points SFO's may/may not be terminated. (See FIG 3-10-14.)

2. Traffic information regarding aircraft in radio communication with or visible to tower controllers which are operating within or adjacent to the flameout maneuvering area is provided to the SFO aircraft and other concerned aircraft.

3. The high-key altitude or practice precautionary approach maneuvering altitudes of the aircraft concerned are obtained prior to approving the approach. (See FIG 3-10-14.)

NOTE-
1. *Practice precautionary/flameout approaches are authorized only for specific aircraft. Precautionary approaches, however, might be made by any aircraft when engine failure is considered possible. The practice precautionary approach maneuvering area/altitudes may not conform to the standard flameout maneuvering area/altitudes.*

2. *Simulated flameout approaches generally require high descent rates. Visibility ahead and beneath the aircraft is greatly restricted.*

3. *Pattern adjustments for aircraft conducting SFO's may impact the effectiveness of SFO training.*

REFERENCE-
FAAO 7110.65, Low Approach and Touch-and-Go, Para 4-8-12.
FAAO 7610.4, Simulated Flame-Out (SFO) Operations, Para 9-3-7.

b. For overhead simulated flameout approaches:

1. Request a report at the entry point.

PHRASEOLOGY-
REPORT (high or low) KEY (as appropriate).

g. Do not apply these procedures when a pilot requests a detailed clearance or to military operations conducted within ALTRV, stereo routes, operations above FL 600, and other military operations requiring special handling.

NOTE-
Departure clearance procedures and phraseology for military operations within approved altitude reservations, military operations above FL 600, and other military operations requiring special handling are contained in separate procedures in this order or in a LOA, as appropriate.

REFERENCE-
FAAO 7110.65, ALTRV Clearance, Para 4-2-7.
FAAO 7110.65, Military Operations Above FL 600, Para 9-3-11.

4-3-4. DEPARTURE RESTRICTIONS, CLEARANCE VOID TIMES, HOLD FOR RELEASE, AND RELEASE TIMES

Assign departure restrictions, clearance void times, hold for release, or release times when necessary to separate departures from other traffic or to restrict or regulate the departure flow.

REFERENCE-
FAAO 7110.65, Overdue Aircraft, Para 10-3-1.
FAAO 7110.65, Traffic Restrictions, Para 10-4-1.
FAAO 7110.65, Traffic Resumption, Para 10-4-3.

a. Clearance Void Times.

1. When issuing clearance void times at airports not served by control towers, provide alternative instructions requiring the pilots to advise ATC of their intentions no later than 30 minutes after the clearance void time if not airborne.

2. The facility delivering a clearance void time to a pilot shall issue a time check.

PHRASEOLOGY-
CLEARANCE VOID IF NOT OFF BY (clearance void time),

and if required,

IF NOT OFF BY (clearance void time), ADVISE (facility) NOT LATER THAN (time) OF INTENTIONS.

TIME (time in hours, minutes, and the nearest quarter minute).

b. Hold For Release (HFR).

1. "Hold for release" instructions shall be used when necessary to inform a pilot or a controller that a departure clearance is not valid until additional instructions are received.

REFERENCE-
P/CG Term- Hold for Release.

2. When issuing hold for release instructions, include departure delay information.

PHRASEOLOGY-
(Aircraft identification) CLEARED TO (destination) AIRPORT AS FILED, MAINTAIN (altitude),

and if required,

(additional instructions or information).

HOLD FOR RELEASE, EXPECT (time in hours and/or minutes) DEPARTURE DELAY.

3. When conditions allow, release the aircraft as soon as possible.

PHRASEOLOGY-
To another controller,

(aircraft identification) RELEASED.

To a flight service specialist,

ADVISE (aircraft identification) RELEASED FOR DEPARTURE.

To a pilot at an airport not served by a control tower,

(aircraft identification) RELEASED FOR DEPARTURE.

c. Release Times.

1. Release times shall be issued to pilots when necessary to specify the earliest time an aircraft may depart.

NOTE-
A release time is a departure restriction issued to a pilot (either directly or through authorized relay) to separate a departing aircraft from other traffic.

2. The facility issuing a release time to a pilot shall include a time check.

PHRASEOLOGY-
(Aircraft identification) RELEASED FOR DEPARTURE AT (time in hours and/or minutes),

and if required,

IF NOT OFF BY (time), ADVISE (facility) NOT LATER THAN (time) OF INTENTIONS.

TIME (time in hours, minutes, and nearest quarter minute).

d. When controlled departure time (CDT) procedures are in effect, the departure terminal shall, to the extent possible, plan ground movement of aircraft destined to the affected airport(s) so that flights are sequenced to depart as near as possible to the assigned EDCT, but no earlier than 5 minutes prior to the EDCT or 15 minutes after the assigned EDCT. If the aircraft is unable to meet these parameters, contact the overlying TMU for a revised EDCT.

NOTE-
(Trust & Verify) EDCT times are revised for changing conditions en route or at affected airport(s). Terminal controllers use of aircraft reported EDCT for departure sequencing should be verified with the ATCSCC or overlying TMU prior to or after aircraft departure.

4-3-5. DELAY SEQUENCING

When aircraft elect to take delay on the ground before departure, issue departure clearances to them in the order in which the requests for clearance were originally made if practicable.

4-3-6. FORWARD DEPARTURE DELAY INFORMATION

Inform approach control facilities and/or towers of anticipated departure delays.

4-3-7. COORDINATION WITH RECEIVING FACILITY

a. Coordinate with the receiving facility before the departure of an aircraft if the departure point is less than 15 minutes flying time from the transferring facility's boundary unless an automatic transfer of data between automated systems will occur, in which case, the flying time requirement may be reduced to 5 minutes or replaced with a mileage from the boundary parameter when mutually agreeable to both facilities.

NOTE-
Agreements requiring additional time are encouraged between facilities that need earlier coordination. However, when agreements establish mandatory radar handoff procedures, coordination needs only be effected in a timely manner prior to transfer of control.

REFERENCE-
FAAO 7110.65, Chapter 5, Section 4, Transfer of Radar Identification, Application, Para 5-4-1.

b. The actual departure time or a subsequent strip posting time shall be forwarded to the receiving facility unless assumed departure times are agreed upon and that time is within 3 minutes of the actual departure time.

4-3-8. VFR RELEASE OF IFR DEPARTURE

When an aircraft which has filed an IFR flight plan requests a VFR departure through a terminal facility, FSS, or air/ground communications station:

a. After obtaining, if necessary, approval from the facility/sector responsible for issuing the IFR clearance, you may authorize an IFR flight planned aircraft to depart VFR. Inform the pilot of the proper frequency and, if appropriate, where or when to contact the facility responsible for issuing the clearance.

PHRASEOLOGY-
VFR DEPARTURE AUTHORIZED. CONTACT (facility) ON (frequency) AT (location or time if required) FOR CLEARANCE.

b. If the facility/sector responsible for issuing the clearance is unable to issue a clearance, inform the pilot, and suggest that the delay be taken on the ground. If the pilot insists upon taking off VFR and obtaining an IFR clearance in the air, inform the facility/sector holding the flight plan of the pilot's intentions and, if possible, the VFR departure time.

4-3-9. FORWARDING DEPARTURE TIMES

TERMINAL

Unless alternate procedures are prescribed in a letter of agreement or automatic departure messages are being transmitted between automated facilities, forward departure times to the facility from which you received the clearance and also to the terminal departure controller when that position is involved in the departure sequence.

NOTE-
1. *Letters of agreement prescribing assumed departure times or mandatory radar handoff procedures are alternatives for providing equivalent procedures.*

2. *The letters "DM" flashing in the data block signify unsuccessful transmission of a departure message.*

REFERENCE-
FAAO 7210.3, Automatic Acquisition/Termination Areas, Para 11-2-6.

Section 5. Altitude Assignment and Verification

4-5-1. VERTICAL SEPARATION MINIMA

Separate instrument flight rules (IFR) aircraft using the following minima between altitudes:

a. Up to and including FL 290- 1,000 feet.

b. Above FL 290- 2,000 feet, except:

1. In oceanic airspace, above FL 450 between a supersonic and any other aircraft- 4,000 feet.

2. Above FL 600 between military aircraft- 5,000 feet.

3. Apply 1,000 feet between approved aircraft if:

(a) Operating within airspace and altitude(s) designated for reduced vertical separation minimum (RVSM) or,

(b) Operating within RVSM transition airspace and designated altitude(s) if:

(1) En route to/from RVSM designated airspace; or,

(2) Within the Anchorage FIR.

NOTE-
1. Oceanic separation procedures are supplemented in Chapter 8; Section 7, Section 8, Section 9, and Section 10.

2. RVSM and RVSM transition airspace is designated in ICAO Regional Supplementary Document, Doc. 7030.4, and via International NOTAM.

REFERENCE-
FAAO 7110.65, Vertical Application, Para 5-5-5.
FAAO 7110.65, Application, Para 6-6-1.
FAAO 7110.65, Military Operations Above FL 600, Para 9-3-11.

4-5-2. FLIGHT DIRECTION

Clear aircraft at altitudes according to the TBL 4-5-1.

Altitude Assignment

Aircraft Operating	*On course degrees magnetic*	*Assign*	*Examples*
Below 3,000 feet above surface	Any course	Any altitude	
Below FL 290	0 through 179	Odd cardinal altitude or flight levels at intervals of 2,000 feet	3,000 5,000, FL 250, FL 270
	180 through 359	Even cardinal altitude or flight levels at intervals of 2,000 feet	4,000, 6000, FL 240, FL 260
At or above FL 290	0 through 179	Odd cardinal flight levels at intervals of 4,000 feet beginning with FL 290	FL 290, FL 330, FL 370
	180 through 359	Odd cardinal flight levels at intervals of 4,000 feet beginning with FL 310	FL 310, FL 350, FL 390
One way routes (except in composite systems)	Any course	Any cardinal altitude or flight level below FL 290 or any odd cardinal flight level at or above FL 290	FL 270, FL 280, FL 310, FL 330
Within an ALTRV	Any course	Any altitude or flight level	
In transition to/ from or within Oceanic airspace where composite separation is authorized	Any course	Any odd or even cardinal flight level including those above FL 290	FL 280, FL 290, FL 300, FL 310, FL 320, FL 330, FL 340
In aerial refueling tracks and anchors	Any course	Altitude blocks as requested. Any altitude or flight level	050B080, FL 1 80B220, FL 280B310
Aircraft within RVSM or RVSM transition airspace	Any course	Any designated cardinal altitude	FL 330, FL 340, FL 350, FL 360

TBL 4-5-1

NOTE-
Oceanic separation procedures are supplemented in Chapter 8; Section 7, Section 8, Section 9, and Section 10.

REFERENCE-
FAAO 7110.65, Exceptions, Para 4-5-3.
FAAO 7110.65, Altitude Assignments, Para 7-7-5.
FAAO 7110.65, Separation Minima, Para 9-4-2.

4-5-3. EXCEPTIONS

When traffic, meteorological conditions, or aircraft operational limitations prevent assignment of altitudes prescribed in para 4-5-2, Flight Direction, assign any cardinal altitude or flight level below FL 290 or any odd cardinal flight level at or above FL 290 without regard to direction of flight as follows:

NOTE-
See para 2-3-9, Control Symbology, for control abbreviations and symbols to be used in conjunction with this paragraph.

a. For traffic conditions, take this action only if one of the following conditions exists:

1. Aircraft remain within a facility's area and prior approval is obtained from other affected positions or sectors or the operations are covered in a Facility Directive.

2. Aircraft will proceed beyond the facility's area and specific operations and procedures permitting random altitude assignment are covered in a letter of agreement between the appropriate facilities.

NOTE-
Those en route facilities using host software that provides capability for passing interim altitude shall include the specific operations and procedures for use of this procedure in a letter of agreement between the appropriate facilities.

b. Military aircraft are operating on random routes and prior approval is obtained from the facility concerned.

c. For meteorological conditions, take this action only if you obtain prior approval from other affected positions or sectors within your facility and, if necessary, from the adjacent facility concerned.

d. For aircraft operational limitations, take this action only if the pilot informs you the available appropriate altitude exceeds the operational limitations of his/her aircraft and only after you obtain prior approval from other affected positions or sectors within your facility and, if necessary, from the adjacent facility concerned.

e. For mission requirements, take this action only when the aircraft is operating on an MTR.

REFERENCE-
FAAO 7110.65, Altitude Assignments, Para 7-7-5.
FAAO 7110.65, Separation Minima, Para 9-4-2.

4-5-4. LOWEST USABLE FLIGHT LEVEL

If a change in atmospheric pressure affects a usable flight level in your area of jurisdiction, use TBL 4-5-2 to determine the lowest usable flight level to clear aircraft at or above 18,000 feet MSL.

Lowest Usable FL

Altimeter Setting	*Lowest Usable FL*
29.92" or higher	180
29.91" to 28.92"	190
28.91" to 27.92"	200

TBL 4-5-2

REFERENCE-
FAAO 7110.65, Separation Minima, Para 9-4-2.

4-5-5. ADJUSTED MINIMUM FLIGHT LEVEL

When the prescribed minimum altitude for IFR operations is at or above 18,000 feet MSL and the atmospheric pressure is less than 29.92", add the appropriate adjustment factor from TBL 4-5-3 to the flight level equivalent of the minimum altitude in feet to determine the adjusted minimum flight level.

Minimum FL Adjustment

Altimeter Setting	*Adjustment Factor*
29.92" or higher	None
29.91" to 29.42"	500 feet
29.41" to 28.92"	1,000 feet
28.91" to 28.42"	1,500 feet
28.41" to 27.92"	2,000 feet

TBL 4-5-3

4-5-6. MINIMUM EN ROUTE ALTITUDES

Except as provided in subparas a and b below, assign altitudes at or above the MEA for the route segment being flown. When a lower MEA for subsequent segments of the route is applicable, issue the lower MEA only after the aircraft is over or past the Fix/NAVAID beyond which the lower MEA applies unless a crossing restriction at or above the higher MEA is issued.

a. An aircraft may be cleared below the MEA but not below the MOCA for the route segment being flown if the altitude assigned is at least 300 feet above the floor of controlled airspace and one of the following conditions are met:

NOTE-
Controllers must be aware that in the event of radio communications failure, a pilot will climb to the MEA for the route segment being flown.

EXAMPLE-
"United Four Seventeen, cross Lakeview V-O-R at and maintain six thousand."

NOTE-
The pilot is authorized to conduct descent "at pilot's discretion," but must comply with the clearance provision to cross Lakeview VOR at 6,000 feet.

EXAMPLE-
"United Four Seventeen, descend now to flight level two seven zero, cross Lakeview V-O-R at or below one zero thousand, descend and maintain six thousand."

NOTE-
The pilot is expected to promptly execute and complete descent to FL 270 upon receipt of the clearance. After reaching FL 270, the pilot is authorized to descend "at pilot's discretion" until reaching Lakeview VOR. The pilot must comply with the clearance provision to cross Lakeview VOR at or below 10,000 feet. After Lakeview VOR, the pilot is expected to descend at the rates specified in the AIM until reaching 6,000 feet.

NOTE-
1. *A descent clearance which specifies a crossing altitude authorizes descent at pilot's discretion for that portion of the flight to which the crossing altitude restriction applies.*

2. *Any other time that authorization to descend at pilot's discretion is intended, it must be specifically stated by the controller.*

3. *The pilot may need to know of any future restrictions that might affect the descent, including those that may be issued in another sector, in order to properly plan a descent at pilot's discretion.*

4. *Controllers need to be aware that the descent rates in the AIM are only suggested and aircraft will not always descend at those rates.*

REFERENCE-
P/CG Term- Pilot's Discretion.

e. When a portion of a climb/descent may be authorized at the pilot's discretion, specify the altitude the aircraft must climb/descend to followed by the altitude to maintain at the pilot's discretion.

PHRASEOLOGY-
CLIMB/DESCEND NOW TO (altitude), THEN CLIMB/DESCEND AT PILOT'S DISCRETION MAINTAIN (altitude).

EXAMPLE-
"United Three Ten, descend now to flight level two eight zero, then descend at pilot's discretion maintain flight level two four zero."

NOTE-
1. *The pilot is expected to commence descent upon receipt of the clearance and to descend at the suggested rates specified in the AIM, para 4-4-9, Adherence to Clearance, until reaching FL 280. At that point, the pilot is authorized to continue descent to FL 240 within the context of the term "at pilot's discretion" as described in the AIM.*

2. *Controllers need to be aware that the descent rates in the AIM are only suggested and aircraft will not always descend at those rates.*

f. When the "pilot's discretion" portion of a climb/descent clearance is being canceled by assigning a new altitude, inform the pilot that the new altitude is an "amended altitude."

EXAMPLE-
"American Eighty Three, amend altitude, descend and maintain Flight Level two six zero."

NOTE-
American Eighty Three, at FL 280, has been cleared to descend at pilot's discretion to FL 240. Subsequently, the altitude assignment is changed to FL 260. Therefore, pilot's discretion is no longer authorized.

g. Altitude assignments involving more than one altitude.

PHRASEOLOGY-
MAINTAIN BLOCK (altitude) THROUGH (altitude).

h. Instructions to vertically navigate on a STAR/FMPS with published restrictions.

PHRASEOLOGY-
DESCEND VIA (STAR/FMSP name and number).

EXAMPLE-
"Descend via the Mudde One Arrival."
"Cross JCT at flight level two four zero, then descend via the Coast Two Arrival."

NOTE-
Clearance to "descend via" authorizes a pilot's discretion descent to comply with published altitude and/or speed crossing restrictions. "Expect" altitudes/speeds are not considered STAR/FMSP crossing restrictions until verbally issued by ATC. They should be used only for planning purposes and should not be used in the event of lost communications, unless ATC has specifically advised the pilot to expect these altitudes/speeds as part of a further clearance.

REFERENCE-
14 CFR Section 91.185(c)(2)(iii)

1. If it is necessary to assign a crossing altitude which differs from the STAR/FMSP altitude, emphasize the change to the pilot.

PHRASEOLOGY-
DESCEND VIA THE (STAR/FMSP) ARRIVAL EXCEPT (revised altitude information).

REFERENCE-
FAAO 7110.65 Clearance Information, Para 4-7-1.
AIM, Standard Terminal Arrival (STAR), Flight Management System Procedures (FMSP) For Arrivals, Para 5-4-1.

i. When a pilot is unable to accept a clearance, issue revised instructions to ensure positive control and standard separation.

NOTE-
1. *14 CFR Section 91.123 states that a pilot is not allowed to deviate from an ATC clearance "that has been obtained... unless an amended clearance is obtained" (except when an emergency exists).*

2. *A pilot is therefore expected to advise the controller if a clearance cannot be accepted when the clearance is issued. "We will try" and other such acknowledgements do not constitute pilot acceptance of an ATC clearance.*

3. *Controllers are expected to issue ATC clearances which conform with normal operational capabilities for each aircraft and do not require "last minute" amendments to ensure standard separation.*

4. *"Expedite" is not to be used in lieu of appropriate restrictions to ensure separation.*

REFERENCE-
FAAO 7110.65, Providing Assistance, Para 10-1-3.

4-5-8. ANTICIPATED ALTITUDE CHANGES

If practicable, inform an aircraft when to expect climb or descent clearance or to request altitude change from another facility.

PHRASEOLOGY-
EXPECT HIGHER/LOWER IN (number of miles or minutes) MILES/MINUTES,

or

AT (fix). REQUEST ALTITUDE/FLIGHT LEVEL CHANGE FROM (name of facility).

If required,

AT (time, fix, or altitude).

REFERENCE-
FAAO 7110.65, IFR Flight Progress Data, Para 2-2-6.

4-5-9. ALTITUDE CONFIRMATION- NONRADAR

a. Request a pilot to confirm assigned altitude on initial contact and when position reports are received unless:

NOTE-
For the purpose of this paragraph, "initial contact" means a pilot's first radio contact with each sector/position.

1. The pilot states the assigned altitude, or

2. You assign a new altitude to a climbing or descending aircraft, or

3. *TERMINAL.* The aircraft was transferred to you from another sector/position within your facility (intrafacility).

PHRASEOLOGY-
(In level flight situations),

VERIFY AT (altitude/flight level).

(In climbing/descending situations),

(if aircraft has been assigned an altitude below the lowest useable flight level),

VERIFY ASSIGNED ALTITUDE (altitude).

(If aircraft has been assigned a flight level at or above the lowest useable flight level),

VERIFY ASSIGNED FLIGHT LEVEL (flight level).

b. *USA.* Reconfirm all pilot altitude read backs.

PHRASEOLOGY-
(If altitude read back is correct),
AFFIRMATIVE (altitude).

(If altitude read back is not correct),
NEGATIVE. CLIMB/DESCEND AND MAINTAIN (altitude),

or

NEGATIVE. MAINTAIN (altitude).

Section 6. Holding Aircraft

4-6-1. CLEARANCE TO HOLDING FIX

Consider operational factors such as length of delay, holding airspace limitations, navigational aids, altitude, meteorological conditions when necessary to clear an aircraft to a fix other than the destination airport. Issue the following:

a. Clearance limit (if any part of the route beyond a clearance limit differs from the last routing cleared, issue the route the pilot can expect beyond the clearance limit).

PHRASEOLOGY-
EXPECT FURTHER CLEARANCE VIA (routing).

EXAMPLE-
"Expect further clearance via direct Stillwater V-O-R, Victor Two Twenty-Six Snapy intersection, direct Newark."

b. Holding instructions.

1. Holding instructions may be eliminated when you inform the pilot that no delay is expected.

2. When the pattern is charted, you may omit all holding instructions except the charted holding direction and the statement "as published." Always issue complete holding instructions when the pilot requests them.

NOTE-
The most generally used holding patterns are depicted on U.S. Government or commercially produced low/high altitude en route, area, and STAR Charts.

PHRASEOLOGY-
CLEARED TO (fix), HOLD (direction), AS PUBLISHED,

or

CLEARED TO (fix), NO DELAY EXPECTED.

c. EFC. Do not specify this item if no delay is expected.

1. When additional holding is expected at any other fix in your facility's area, state the fix and your best estimate of the additional delay. When more than one fix is involved, state the total additional en route delay (omit specific fixes).

NOTE-
Additional delay information is not used to determine pilot action in the event of two-way communications failure. Pilots are expected to predicate their actions solely on the provisions of 14 CFR Section 91.185.

PHRASEOLOGY-
EXPECT FURTHER CLEARANCE (time),

and if required,

ANTICIPATE ADDITIONAL (time in minutes/hours) MINUTE/HOUR DELAY AT (fix),

or

ANTICIPATE ADDITIONAL (time in minutes/hours) MINUTE/HOUR EN ROUTE DELAY.

EXAMPLE-
1. *"Expect further clearance one niner two zero, anticipate additional three zero minute delay at Sweet."*

2. *"Expect further clearance one five one zero, anticipate additional three zero minute en route delay."*

2. When additional holding is expected in an approach control area, state the total additional terminal delay.

PHRASEOLOGY-
EXPECT FURTHER CLEARANCE (time),

and if required,

ANTICIPATE ADDITIONAL (time in minutes/hours) MINUTE/HOUR TERMINAL DELAY.

3. *TERMINAL.* When terminal delays exist or are expected, inform the appropriate center or approach control facility so that the information can be forwarded to arrival aircraft.

4. When delay is expected, issue items in subparas a and b at least 5 minutes before the aircraft is estimated to reach the clearance limit. If the traffic situation requires holding an aircraft that is less than 5 minutes from the holding fix, issue these items immediately.

NOTE-
1. *The AIM indicates that pilots should start speed reduction when 3 minutes or less from the holding fix. The additional 2 minutes contained in the 5-minute requirement are necessary to compensate for different pilot/controller ETAS at the holding fix, minor differences in clock times, and provision for sufficient planning and reaction times.*

2. *When holding is necessary, the phrase "delay indefinite" should be used when an accurate estimate of the delay time and the reason for the delay cannot immediately be determined; i.e., disabled aircraft on the runway, terminal*

or center sector saturation, weather below landing minimums, etc. In any event, every attempt should be made to provide the pilot with the best possible estimate of his/her delay time and the reason for the delay. Controllers/supervisors should consult, as appropriate, with personnel (other sectors, weather forecasters, the airport management, other facilities, etc.) who can best provide this information.

PHRASEOLOGY-
DELAY INDEFINITE, (reason if known), EXPECT FURTHER CLEARANCE (time). (After determining the reason for the delay, advise the pilot as soon as possible.)

EXAMPLE-
"Cleared to Drewe, hold west, as published, expect further clearance via direct Sidney V-O-R one three one five, anticipate additional two zero minute delay at Woody."

"Cleared to Aston, hold west on Victor two twenty-five, seven mile leg, left turns, expect further clearance one niner two zero, anticipate additional one five minute terminal delay."

"Cleared to Wayne, no delay expected."

"Cleared to Wally, hold north, as published, delay indefinite, snow removal in progress, expect further clearance one one three zero."

4-6-2. CLEARANCE BEYOND FIX

a. If no delay is expected, issue a clearance beyond the clearance limit as soon as possible and, whenever possible, at least 5 minutes before the aircraft reaches the fix.

b. Include the following items when issuing clearance beyond a clearance limit:

1. Clearance limit or approach clearance.

2. Route of flight. Specify one of the following:

(a) Complete details of the route (airway, route, course, fix(es), azimuth course, heading, arc, or vector.)

(b) The phrase "via last routing cleared." Use this phrase only when the most recently issued routing to the new clearance limit is valid and verbiage will be reduced.

PHRASEOLOGY-
VIA LAST ROUTING CLEARED.

3. Assigned altitude if different from present altitude.

NOTE-
Except in the event of a two-way communications failure, when a clearance beyond a fix has not been received, pilots are expected to hold as depicted on U.S. Government or commercially produced (meeting FAA requirements) low/high altitude en route and area or STAR charts. If no holding pattern is charted and holding instructions have not been issued, pilots should ask ATC for holding instructions prior to reaching the fix. If a pilot is unable to obtain holding instructions prior to reaching the fix, the pilot is expected to hold in a standard pattern on the course on which the aircraft approached the fix and request further clearance as soon as possible.

4-6-3. DELAYS

a. Advise your supervisor or flow controller as soon as possible when you delay or expect to delay aircraft.

b. When arrival delays reach or are anticipated to reach 30 minutes, take the following action:

1. *EN ROUTE.* The center responsible for transferring control to an approach control facility or, for a nonapproach control destination, the center in whose area the aircraft will land shall issue total delay information as soon as possible after the aircraft enters the center's area. Whenever possible, the delay information shall be issued by the first center controller to communicate with the aircraft.

2. *TERMINAL.* When tower en route control service is being provided, the approach control facility whose area contains the destination airport shall issue total delay information as soon as possible after the aircraft enters its approach control area. Whenever possible, the delay information shall be issued by the first terminal controller to communicate with the aircraft.

3. Unless a pilot requests delay information, the actions specified in subparas 1 and 2 above may be omitted when total delay information is available to pilots via ATIS.

PHRASEOLOGY-
(Airport) ARRIVAL DELAYS (time in minutes/hours).

4-6-4. HOLDING INSTRUCTIONS

When issuing holding instructions, specify:

a. Direction of holding from the fix/waypoint.

b. Holding fix or waypoint.

NOTE-
The holding fix may be omitted if included at the beginning of the transmission as the clearance limit.

c. Radial, course, bearing, track, azimuth, airway, or route on which the aircraft is to hold.

d. Leg length in miles if DME or RNAV is to be used. Specify leg length in minutes if the pilot requests it or you consider it necessary.

e. Direction of holding pattern turns only if left turns are to be made, the pilot requests it, or you consider it necessary.

PHRASEOLOGY-
HOLD (direction) OF (fix/waypoint) ON (specified radial, course, bearing, track, airway, azimuth(s), or route.)

If leg length is specified,

(number of minutes/miles) MINUTE/MILE LEG.

If direction of turn is specified,

LEFT/RIGHT TURNS.

NOTE-
It is mandatory for the controller to issue left or right turns every time a holding pattern is issued for MLS.

f. Issue maximum holding airspeed advisories when an aircraft is:

1. Approved to exceed the maximum airspeed of a pattern, and is cleared into a holding pattern that will protect for the greater speed; or

2. Observed deviating from the holding pattern airspace area; or

3. Cleared into an airspeed restricted holding pattern in which the icon has not been published.

EXAMPLE-
Due to turbulence, a turboprop requests to exceed the recommended maximum holding airspeed. ATCS may clear the aircraft into a pattern that protects for the airspeed request, and shall advise the pilot of the maximum holding airspeed for the holding pattern airspace area.

PHRASEOLOGY-
"MAXIMUM HOLDING AIRSPEED IS TWO ONE ZERO KNOTS."

4-6-5. VISUAL HOLDING POINTS

You may use as a holding fix a location which the pilot can determine by visual reference to the surface if he/she is familiar with it.

PHRASEOLOGY-
HOLD AT (location) UNTIL (time or other condition.)

REFERENCE-
FAAO 7110.65, Visual Holding of VFR Aircraft, Para 7-1-4.

4-6-6. HOLDING FLIGHT PATH DEVIATION

Approve a pilot's request to deviate from the prescribed holding flight path if obstacles and traffic conditions permit.

4-6-7. UNMONITORED NAVAID'S

Separate an aircraft holding at an unmonitored NAVAID from any other aircraft occupying the course which the holding aircraft will follow if it does not receive signals from the NAVAID.

4-6-8. ILS PROTECTION/CRITICAL AREAS

When conditions are less than reported ceiling 800 feet and/or visibility of 2 miles, do not authorize aircraft to hold below 5,000 feet AGL inbound toward the airport on or within 1 statute mile of the localizer between the ILS OM or the fix used in lieu of the OM and the airport. *USAF.* The holding restriction applies only when an arriving aircraft is between the ILS OM or the fix used in lieu of the OM and the runway.

REFERENCE-
FAAO 7130.3, Holding Pattern Criteria, Para 54 and FIG 20.

1. Aircraft identification.

2. Type aircraft if required for separation purposes.

3. Type of instrument approach procedure and/or runway if differing from that in use.

NOTE-
The local controller has the responsibility to determine whether or not conditions are adequate for the use of ATTS data on the CTRD where a facility directive authorizes its use for the transfer of arrival data.

REFERENCE-
FAAO 7210.3, Use of Modify and Quick Look Functions, Para 11-2-4.
FAAO 7210.3, Use of STARS Quick Look Functions, Para 11-8-4.

c. Where the collocated or satellite tower has ATTS data displayed on its CTRD, the ATTS modify or quick look functions may be used to forward arrival data provided that a facility directive at the collocated tower or a letter of agreement with the satellite tower exists which outlines procedures for using ATTS for transferring this data.

d. Forward the following information to centers:

1. Where two or more instrument approach procedures are published for the airport, the particular procedure which an aircraft can expect or that it will be vectored toward the airport for a visual approach.

2. Highest altitude being used by the approach control facility at the holding fix.

3. Average time interval between successive approaches.

4. Arrival time of aircraft over the holding fix or, if control has been transferred to you before an aircraft has reached the fix, a statement or other indication acknowledging receipt of control responsibility.

5. Revised EFC if different by 10 minutes or more from that issued by the center.

6. Missed approaches if they affect center operations.

7. Information relating to an unreported or overdue aircraft.

4-7-12. AIRPORT CONDITIONS

a. *EN ROUTE.* Before issuing an approach clearance or en route descent, and subsequently as changes occur, inform an aircraft of any abnormal operation of approach and landing aids and of destination airport conditions that you know of which might restrict an approach or landing.

b. *TERMINAL.* On first contact or as soon as possible thereafter, and subsequently as changes occur, inform an aircraft of any abnormal operation of approach and landing aids and of destination airport conditions that you know of which might restrict an approach or landing. This information may be omitted if it is contained in the ATIS broadcast and the pilot states the appropriate ATIS code.

REFERENCE-
FAAO 7110.65, Chapter 3, Section 3, Airport Conditions.

c. *TERMINAL.* Where RCR's are provided, transmit this information to USAF and ANG aircraft in accordance with one of the following. Issue the RCR to other aircraft upon pilot request.

1. Before or when an approach clearance is issued.

2. Before an en route descent clearance is issued.

3. Prior to departure.

4. As soon as possible after receipt of any subsequent changes in previously issued RCR information.

NOTE-
1. USAF has established RCR procedures for determining the average deceleration readings of runways under conditions of water, slush, ice, or snow. The use of RCR code is dependent upon the pilot having a "stopping capability chart" specifically applicable to his/her aircraft.

2. USAF offices furnish RCR information at airports serving USAF and ANG aircraft.

REFERENCE-
FAAO 7110.65, Landing Area Condition, Para 3-3-1.

4-7-13. SWITCHING ILS/MLS RUNWAYS

TERMINAL

When a change is made from one ILS to another or from one MLS to another at airports equipped with multiple systems which are not used simultaneously, coordinate with the facilities which use the fixes formed by reference to these NAVAID's.

Chapter 5. Radar

Section 1. General

5-1-1. PRESENTATION AND EQUIPMENT PERFORMANCE

Provide radar service only if you are personally satisfied that the radar presentation and equipment performance is adequate for the service being provided.

NOTE-
The provision of radar service is not limited to the distance and altitude parameters obtained during the commissioning flight check.

5-1-2. ALIGNMENT ACCURACY CHECK

During relief briefing, or as soon as possible after assuming responsibility for a control position, check the operating equipment for alignment accuracy and display acceptability. Recheck periodically throughout the watch.

REFERENCE-
FAAO 7210.3, Chapter 3, Chapter 8, Chapter 9, Chapter 10, and Chapter 11.
Comparable Military Directives.

TERMINAL

a. Check the alignment of the radar video display by assuring that the video/digital map or overlay is properly aligned with a permanent target of known range and azimuth on the radar display. Where possible, check one permanent target per quadrant.

b. Accuracy of the radar video display shall be verified for digitized radar systems by using the moving target indicator (MTI) reflectors, fixed location beacon transponders (Parrots), beacon real-time quality control (RTQC) symbols or calibration performance monitor equipment (CPME) beacon targets.

REFERENCE-
FAAO 7210.3, Tolerance for Radar Fix Accuracy, Para 3-8-1.

EN ROUTE

c. When operating in the narrowband mode (Stage A) alignment checking is accomplished by the operational program as part of the certification procedures for system startup and then on a real-time basis during operational hours.

d. When operating in the EDARC/DARC/HOST or EDARC/DARC mode, ensure the PVD/MDM center and altitude limits for the system are appropriate for the operating position.

REFERENCE-
FAAO 7110.65, Selected Altitude Limits, Para 5-14-5.

5-1-3. RADAR USE

Use radar information derived from primary and secondary radar systems.

REFERENCE-
FAAO 7110.65, Beacon Range Accuracy, Para 5-1-4.
FAAO 7110.65, Inoperative or Malfunctioning Interrogator, Para 5-2-15.

a. Secondary radar may be used as the sole display source as follows:

1. In Class A airspace.

REFERENCE-
FAAO 7110.65, Failed Transponder in Class A Airspace, Para 5-2-16.
14 CFR Section 91.135, Operations in Class A Airspace.

2. Outside Class A airspace, or where mix of Class A airspace/non-Class A airspace exists, only when:

(a) Additional coverage is provided by secondary radar beyond that of the primary radar.

(b) The primary radar is temporarily unusable or out of service. Advise pilots when these conditions exist.

PHRASEOLOGY-
PRIMARY RADAR OUT OF SERVICE. RADAR TRAFFIC ADVISORIES AVAILABLE ON TRANSPONDER AIRCRAFT ONLY.

NOTE-
1. *Advisory may be omitted when provided on ATIS and pilot indicates having ATIS information.*

2. *Advisory may be omitted when there is overlapping primary radar coverage from multiple radar sites.*

(c) A secondary radar system is the only source of radar data for the area of service. When the system is used for separation, beacon range accuracy is assured, as provided in para 5-1-4, Beacon Range Accuracy.

NOTE-
1. *This provision is to authorize secondary radar only operations where there is no primary radar available and the condition is temporary.*

2. *Since Terminal facilities use Long Range Radar, this is applicable to En Route and Terminal Radar Facilities.*

b. *TERMINAL.* Do not use secondary radar to conduct surveillance (ASR) final approaches unless the system is fully digitized, or an emergency exists and the pilot concurs.

5-1-4. BEACON RANGE ACCURACY

a. You may use beacon targets for separation purposes if beacon range accuracy is verified by one of the following methods:

NOTE-
1. *The check for verification of beacon range accuracy accomplished by correlation of beacon and primary radar targets of the same aircraft is not a check of display accuracy. Therefore, it is not necessary that it be done using the same display with which separation is being provided, nor the same targets being separated.*

2. *Narrowband: Beacon range accuracy for automated narrowband display equipment is verified by AF personnel. Consequently, further verification by the controller is unnecessary.*

1. Correlate beacon and primary targets of the same aircraft (not necessarily the one being provided separation) to assure that they coincide.

2. When beacon and primary targets of the same aircraft do not coincide, correlate them to assure that any beacon displacement agrees with the specified distance and direction for that particular radar system.

3. Refer to beacon range monitoring equipment where so installed.

b. If beacon range accuracy cannot be verified, you may use beacon targets only for traffic information.

REFERENCE-
FAAO 7110.65, Radar Use, Para 5-1-3.

5-1-5. ECM/ECCM ACTIVITY

a. Refer all ECM/ECCM activity requests to the appropriate center supervisor.

REFERENCE-
FAAO 7610.4, Chapter 2, Section 7, Electronic Counter Measures (ECM) Missions/Exercises.

NOTE-
ECM activity can subsequently result in a request to apply ECCM videos to the radar system which may necessitate the decertification of the narrowband search radar. The Systems Engineer should be consulted concerning the effect of ECM/ECCM on the operational use of the narrowband radar prior to approving/disapproving requests to conduct ECM/ECCM activity.

b. When ECM activity interferes with the operational use of radar:

1. *EN ROUTE.* Request the responsible military unit or aircraft, if initial request was received directly from pilot, to suspend the activity.

2. *TERMINAL.* Request suspension of the activity through the ARTCC. If immediate cessation of the activity is required, broadcast the request directly to the ECM aircraft on the emergency frequency. Notify the ARTCC of direct broadcast as soon as possible.

c. When previously suspended activity will no longer interfere:

3. *EN ROUTE.* Inform the NORAD unit or aircraft that it may be resumed.

4. *TERMINAL.* Inform the ARTCC or aircraft that it may be resumed. Obtain approval from the ARTCC prior to broadcasting a resume clearance directly to the aircraft.

d. In each stop request, include your facility name, type of ECM activity (chaff dispensing- "stream"/ "burst" or electronic jamming- "buzzer"), radar band affected and, when feasible, expected duration of suspension.

PHRASEOLOGY-
BIG PHOTO (identification, if known) (name) CENTER/ TOWER/APPROACH CONTROL.

To stop ECM activity:

STOP STREAM/BURST IN AREA (area name) (degree and distance from facility),

or

STOP BUZZER ON (frequency band or channel).

To resume ECM activity

RESUME STREAM/BURST,

or

RESUME BUZZER ON (frequency band or channel).

5-1-6. SERVICE LIMITATIONS

a. When radar mapping is not available, limit radar services to:

1. Separating identified aircraft targets.

2. Vectoring aircraft to intercept a PAR final approach course.

3. Providing radar service in areas that ensure no confliction with traffic on airways, other ATC areas of jurisdiction, restricted or prohibited areas, terrain, etc.

b. *EN ROUTE.* Stage A and DARC- When the position symbol associated with the full data block falls more than one history behind the actual aircraft target or there is no target symbol displayed, the Mode C information in the full data block shall not be used for the purpose of determining separation.

c. Report radar malfunctions immediately for corrective action and for dispatch of a Notice to Airmen. Advise adjacent ATC facilities when appropriate.

REFERENCE-
FAAO 7110.65, Reporting Essential Flight Information, Para 2-1-9.
FAAO 7210.3, Chapter 3, Chapter 7, Chapter 10 Section 5, and Chapter 11 Section 2.

5-1-7. ELECTRONIC CURSOR

TERMINAL

a. An electronic cursor may be used to aid in identifying and vectoring an aircraft and to give finer delineation to a video map. Do not use it as a substitute for a video map or map overlay; e.g., to form intersections, airway boundaries, final approach courses, etc.

b. Fixed electronic cursors may be used to form the final approach course for surveillance approaches conducted by military operated mobile radar facilities.

5-1-8. MERGING TARGET PROCEDURES

a. Except while they are established in a holding pattern, apply merging target procedures to all radar identified:

1. Aircraft at 10,000 feet and above.

2. Turbojet aircraft regardless of altitude.

REFERENCE-
P/CG Term- Turbojet Aircraft.

3. Presidential aircraft regardless of altitude.

b. Issue traffic information to those aircraft listed in subpara a whose targets appear likely to merge unless the aircraft are separated by more than the appropriate vertical separation minima.

EXAMPLE-
"Traffic twelve o'clock, seven miles, eastbound, MD-80, at one seven thousand."

"United Sixteen and American Twenty-five, traffic twelve o'clock, one zero miles, opposite direction, eastbound seven twenty seven at flight level three three zero, westbound MD-Eighty at flight level three one zero."

c. If the pilot requests, vector his/her aircraft to avoid merging with the target of previously issued traffic.

NOTE-
Aircraft closure rates are so rapid that when applying merging target procedures, controller issuance of traffic must be commenced in ample time for the pilot to decide if a vector is necessary.

d. If unable to provide vector service, inform the pilot.

5-1-9. HOLDING PATTERN SURVEILLANCE

Provide radar surveillance of outer fix holding pattern airspace areas, or any portions thereof, shown on your radar scope (displayed on the video map or scribed on the map overlay) whenever aircraft are holding there. Attempt to detect any aircraft that stray outside the area. If you detect an aircraft straying outside the area, assist it to return to the assigned airspace.

5-1-10. DEVIATION ADVISORIES

Inform an aircraft when it is observed in a position and on a track which will obviously cause the aircraft to deviate from its protected airspace area. If necessary, assist the aircraft to return to the assigned protected airspace.

REFERENCE-
FAAO 7110.65, Route or Altitude Amendments, Para 4-2-5.
FAAO 7110.65, Methods, Para 7-9-3.

5-1-11. RADAR FIX POSTING

EN ROUTE

A controller is required to manually record at least once the observed or reported time over a fix for each controlled aircraft in their sector of responsibility only when the flight progress recording components of the HOST/DARC or the EARTS systems are not operational.

REFERENCE-
FAAO 7210.3, Flight Progress Strip Usage, Para 6-1-6.
FAAO 7210.3, Flight Progress Strip Usage, Para 10-1-8.

5-1-12. POSITION REPORTING

If necessary, you may request an aircraft to provide an estimate or report over a specific fix. After an aircraft receives the statement "radar contact" from ATC, it discontinues reporting over compulsory reporting points. It resumes normal position reporting when ATC informs it "radar contact lost" or "radar service terminated."

REFERENCE-
P/CG Term- Radar Contact.

a. When required, inform an aircraft of its position with respect to a fix or airway.

PHRASEOLOGY-
OVER/PASSING (fix).

(Number of miles) MILES FROM (fix).

(Number of miles) MILES (direction) OF (fix, airway, or location).

CROSSING/JOINING/DEPARTING (airway or route).

INTERCEPTING/CROSSING (name of NAVAID) (specified) RADIAL.

5-1-13. RADAR SERVICE TERMINATION

a. Inform aircraft when radar service is terminated.

PHRASEOLOGY-
RADAR SERVICE TERMINATED (nonradar routing if required).

b. Radar service is automatically terminated and the aircraft needs not be advised of termination when:

NOTE-
1. *Termination of radar monitoring when conducting simultaneous ILS/MLS approaches is prescribed in para 5-9-7, Simultaneous Independent ILS/MLS Approaches- Dual & Triple.*

2. *Termination of radar monitoring where PAR equipment is used to monitor approaches is prescribed in para 5-13-3, Monitor Information.*

1. An aircraft cancels its IFR flight plan, except within Class B airspace, Class C airspace, TRSA, or where basic radar service is provided.

2. An aircraft conducting an instrument, visual, or contact approach has landed or has been instructed to change to advisory frequency.

3. At tower-controlled airports where radar coverage does not exist to within $^1/_2$ mile of the end of the runway, arriving aircraft shall be informed when radar service is terminated.

REFERENCE-
FAAO 7210.3, Radar Tolerances, Para 10-5-6.

4. *TERMINAL.* An arriving VFR aircraft receiving radar service to a tower-controlled airport within Class B airspace, Class C airspace, TRSA, or where basic radar service is provided has landed, or to all other airports, is instructed to change to tower or advisory frequency.

5. *TERMINAL.* An aircraft completes a radar approach.

REFERENCE-
FAAO 7110.65, Service Provided When Tower is Inoperative, Para 7-6-12.

Section 2. Beacon Systems

5-2-1. ASSIGNMENT CRITERIA

a. General.

1. Mode 3/A is designated as the common military/ civil mode for air traffic control use.

2. Make radar beacon code assignments to only Mode 3/A transponder-equipped aircraft.

b. Unless otherwise specified in a directive or a letter of agreement, make code assignments to departing, en route, and arrival aircraft in accordance with the procedures specified in this section for the radar beacon code environment in which you are providing ATC service. Give first preference to the use of discrete beacon codes.

PHRASEOLOGY-
SQUAWK THREE/ALFA (code),

or

SQUAWK (code).

NOTE-
A code environment is determined by an operating position's/sector's equipment capability to decode radar beacon targets using either the first and second or all four digits of a beacon code.

REFERENCE-
FAAO 7110.65, Beacon Identification Methods, Para 5-3-3.

5-2-2. DISCRETE ENVIRONMENT

a. Issue discrete beacon codes assigned by the computer. Computer-assigned codes may be modified as required.

1. *TERMINAL.* Aircraft that will remain within the terminal facility's delegated airspace shall be assigned a code from the code subset allocated to the terminal facility.

2. *TERMINAL.* Unless otherwise specified in a facility directive or a letter of agreement, aircraft that will enter an adjacent ATTS facility's delegated airspace shall be assigned a beacon code assigned by the ARTCC computer.

NOTE-
1. *This will provide the adjacent facility advance information on the aircraft and will cause auto-acquisition of the aircraft prior to handoff.*

2. *When an IFR aircraft, or a VFR aircraft that has been assigned a beacon code by the host computer and whose flight plan will terminate in another facility's area, cancels ATC service or does not activate the flight plan, send a remove strips (RS) message on that aircraft via host keyboard, the FDIO keyboard, or call via service F.*

b. Make handoffs to other positions/sectors on the computer-assigned code.

c. Coastal facilities accepting "over" traffic that will subsequently be handed-off to an oceanic ARTCC shall reassign a new discrete beacon code to an aircraft when it first enters the receiving facility's airspace. The code reassignment shall be accomplished by inputting an appropriate message into the computer and issued to the pilot while operating in the first sector/position in the receiving facility's airspace.

NOTE-
Per an agreement between FAA and the Department of Defense, 17 Code subsets in the NBCAP have been reserved for exclusive military use outside NBCAP airspace. To maximize the use of these subsets, they have been allocated to ARTCC's underlying NBCAP airspace that do not abut an oceanic ARTCC's area. To preclude a potential situation where two aircraft might be in the same airspace at the same time on the same discrete code, it is necessary to reassign an aircraft another code as specified in subpara c.

REFERENCE-
FAAO 7110.65, Mixed Environment, Para 5-2-4.
FAAO 7110.65, VFR Code Assignments, Para 5-2-9.
FAAO 7110.65, Beacon Identification Methods, Para 5-3-3.

5-2-3. NONDISCRETE ENVIRONMENT

a. Assign appropriate nondiscrete beacon codes from the function codes specified in para 5-2-6, Function Code Assignments.

b. Unless otherwise coordinated at the time of handoff, make handoffs to other positions/sectors on an appropriate nondiscrete function code.

REFERENCE-
FAAO 7110.65, Mixed Environment, Para 5-2-4.
FAAO 7110.65, VFR Code Assignments, Para 5-2-9.
FAAO 7110.65, Beacon Identification Methods, Para 5-3-3.

5-2-4. MIXED ENVIRONMENT

a. When discrete beacon code capability does not exist in your area of responsibility, comply with the procedures specified in para 5-2-3, Nondiscrete Environment.

NOTE-
In a mixed code environment, a situation may exist where a discrete-equipped position/sector exchanges control of aircraft with nondiscrete-equipped facilities or vice versa.

b. When discrete beacon code capability exists in your area of responsibility:

1. Comply with the procedures specified in para 5-2-2, Discrete Environment, and

2. Unless otherwise coordinated at the time of handoff, assign aircraft that will enter the area of responsibility of a nondiscrete-equipped position/sector an appropriate nondiscrete function code from the codes specified in para 5-2-6, Function Code Assignments, prior to initiating a handoff.

REFERENCE-
FAAO 7110.65, IFR-VFR and VFR-IFR Flights, Para 4-2-8.
FAAO 7110.65, VFR Code Assignments, Para 5-2-9.
FAAO 7110.65, Beacon Identification Methods, Para 5-3-3.

5-2-5. RADAR BEACON CODE CHANGES

Unless otherwise specified in a directive or a letter of agreement or coordinated at the time of handoff, do not request an aircraft to change from the code it was squawking in the transferring facility's area until the aircraft is within your area of responsibility.

REFERENCE-
FAAO 7110.65, IFR-VFR and VFR-IFR Flights, Para 4-2-8.
FAAO 7110.65, Beacon Identification Methods, Para 5-3-3.

5-2-6. FUNCTION CODE ASSIGNMENTS

Unless otherwise specified by a directive or a letter of agreement, make nondiscrete code assignments from the following categories:

a. Assign codes to departing IFR aircraft as follows:

1. **Code 2000** to an aircraft which will climb to FL 240 or above or to an aircraft which will climb to FL 180 or above where the base of Class A airspace and the base of the operating sector are at FL 180, and for inter-facility handoff the receiving sector is also stratified at FL 180. The en route code shall not be assigned until the aircraft is established in the high altitude sector.

2. **Code 1100** to an aircraft which will remain below FL 240 or below FL 180 as above.

3. For handoffs from terminal facilities when so specified in a letter of agreement as follows:

(a) Within NBCAP airspace- **Code 0100 to Code 0400** inclusive or any other code authorized by the regional air traffic division.

(b) Outside NBCAP airspace- **Code 1000** or one of the codes from **0100 to 0700** inclusive or any other code authorized by the regional air traffic division.

b. Assign codes to en route IFR aircraft as follows:

NOTE-
1. FL 180 may be used in lieu of FL 240 where the base of Class A airspace and the base of the operating sector are at FL 180, and for inter-facility handoff the receiving sector is also stratified at FL 180.

2. The provisions of subparas b2(b) and (c) may be modified by facility directive or letter of agreement when operational complexities or simplified sectorization indicate. Letters of agreement are mandatory when the operating sectors of two facilities are not stratified at identical levels. The general concept of utilizing codes 2100 through 2500 within Class A airspace should be adhered to.

1. Aircraft operating below FL 240 or when control is transferred to a controller whose area includes the stratum involved.

(a) **Code 1000** may be assigned to aircraft changing altitudes.

(b) **Code 1100** to an aircraft operating at an assigned altitude below FL 240. Should an additional code be operationally desirable, **code 1300** shall be assigned.

2. Aircraft operating at or above FL 240 or when control is transferred to a controller whose area includes the stratum involved.

(a) **Code 2300** may be assigned to aircraft changing altitudes.

(b) **Code 2100** to an aircraft operating at an assigned altitude from FL 240 to FL 330 inclusive. Should an additional code be operationally desirable, **code 2200** shall be assigned.

(c) **Code 2400** to an aircraft operating at an assigned altitude from FL 350 to FL 600 inclusive. Should an additional code be operationally desirable, **code 2500** shall be assigned.

3. **Code 4000** when aircraft are operating on a flight plan specifying frequent or rapid changes in assigned altitude in more than one stratum or other conditions of flight not compatible with a stratified code assignment.

NOTE-
1. *Categories of flight that can be assigned code 4000 include certain flight test aircraft, MTR missions, aerial refueling operation requiring descent involving more than one stratum, ALTRV's where continuous monitoring of ATC communications facilities is not required and frequent altitude changes are approved, and other aircraft operating on flight plans requiring special handling by ATC.*

2. *Military aircraft operating VFR or IFR in restricted/warning areas or VFR on VR routes will adjust their transponders to reply on code 4000 unless another code has been assigned by ATC or coordinated, if possible, with ATC.*

c. Assign the following codes to arriving IFR aircraft, except military turbojet aircraft as specified in para 4-7-4, Radio Frequency and Radar Beacon Changes for Military Aircraft:

NOTE-
FL 180 may be used in lieu of FL 240 where the base of Class A airspace and the base of the operating sector are at FL 180, and for inter-facility handoff the receiving sector is also stratified at FL 180.

1. Code 2300 may be assigned for descents while above FL 240.

2. Code 1500 may be assigned for descents into and while within the strata below FL 240, or with prior coordination the specific code utilized by the destination controller, or the code currently assigned when descent clearance is issued.

3. The applicable en route code for the holding altitude if holding is necessary before entering the terminal area and the appropriate code in subparas 1 or 2.

REFERENCE-
FAAO 7110.65, IFR-VFR and VFR-IFR Flights, Para 4-2-8.
FAAO 7110.65, Nondiscrete Environment, Para 5-2-3.
FAAO 7110.65, Mixed Environment, Para 5-2-4.
FAAO 7110.65, VFR Code Assignments, Para 5-2-9.
FAAO 7110.65, Beacon Identification Methods, Para 5-3-3.

5-2-7. EMERGENCY CODE ASSIGNMENT

Assign codes to emergency aircraft as follows:

a. Code 7700 when the pilot declares an emergency and the aircraft is not radar identified.

PHRASEOLOGY-
SQUAWK MAYDAY ON 7700.

b. After radio and radar contact have been established, you may request other than single-piloted helicopters and single-piloted turbojet aircraft to change from **code 7700** to another code appropriate for your radar beacon code environment.

NOTE-
1. *The code change, based on pilot concurrence, the nature of the emergency, and current flight conditions will signify to other radar facilities that the aircraft in distress is identified and under ATC control.*

2. *Pilots of single-piloted helicopters and single-piloted turbojet aircraft may be unable to reposition transponder controls during the emergency.*

PHRASEOLOGY-
RADAR CONTACT (position). IF FEASIBLE, SQUAWK (code).

REFERENCE-
FAAO 7110.65, Beacon Identification Methods, Para 5-3-3.

c. The following shall be accomplished on a Mode C equipped VFR aircraft which is in emergency but no longer requires the assignment of **code 7700**:

1. *TERMINAL.* Assign a beacon code that will permit terminal minimum safe altitude warning (MSAW) alarm processing.

2. *EN ROUTE.* An appropriate keyboard entry shall be made to ensure en route MSAW (EMSAW) alarm processing.

5-2-8. RADIO FAILURE

When you observe a **code 7600** display, apply the procedures in para 10-4-4, Communications Failure.

NOTE-
Should a transponder-equipped aircraft experience a loss of two-way radio communications capability, the pilot can be expected to adjust his/her transponder to code 7600.

REFERENCE-
FAAO 7110.65, Beacon Identification Methods, Para 5-3-3.

5-2-9. VFR CODE ASSIGNMENTS

a. For VFR aircraft receiving radar advisories, assign an appropriate function code or computer-assigned code for the code environment in which you are providing service.

NOTE-
1. *Para 5-2-2, Discrete Environment; para 5-2-3, Nondiscrete Environment, and para 5-2-4, Mixed Environment, specify code assignment procedures to follow for the three code environments.*

2. *Para 5-2-6, Function Code Assignments, specifies the function code allocation from which an appropriate code for the aircraft indicated in subpara a should be selected. In the terminal environment, additional function codes may be authorized by the regional air traffic division.*

1. If the aircraft is outside of your area of responsibility and an operational benefit will be gained by retaining the aircraft on your frequency for the purpose of providing services, ensure that coordination has been effected:

(a) As soon as possible after positive identification, and

(b) Prior to issuing a control instruction or providing a service other than a safety alert/traffic advisory.

NOTE-
Safety alerts/traffic advisories may be issued to an aircraft prior to coordination if an imminent situation may be averted by such action. Coordination should be effected as soon as possible thereafter.

b. Instruct IFR aircraft which cancel an IFR flight plan and are not requesting radar advisory service and VFR aircraft for which radar advisory service is being terminated to squawk the VFR code.

PHRASEOLOGY-
SQUAWK VFR.

or

SQUAWK 1200.

NOTE-
1. *Aircraft not in contact with an ATC facility may squawk 1255 in lieu of 1200 while en route to/from or within the designated fire fighting area(s).*

2. *VFR aircraft which fly authorized SAR missions for the USAF or USCG may be advised to squawk 1277 in lieu of 1200 while en route to/from or within the designated search area.*

REFERENCE-
FAAO 7110.66, National Beacon Code Allocation Plan.

c. When an aircraft changes from VFR to IFR, the controller shall assign a beacon code to Mode C equipped aircraft that will allow MSAW alarms.

REFERENCE-
FAAO 7110.65, Beacon Identification Methods, Para 5-3-3.

5-2-10. BEACON CODE FOR PRESSURE SUIT FLIGHTS AND FLIGHTS ABOVE FL 600

a. Mode 3/A, **code 4400**, and discrete codes **4401 through 4477** are reserved for use by R-71, F-12, U-2, B-57, pressure suit flights, and aircraft operations above FL 600.

NOTE-
The specific allocation of the special use codes in subset 4400 is in FAAO 7110.66, National Beacon Code Allocation Plan.

b. Ensure that aircraft remain on **code 4400** or one of the special use discrete codes in the **4400** subset if filed as part of the flight plan. Except when unforeseen events, such as weather deviations, equipment failure, etc., cause more than one aircraft with same Mode 3/A discrete beacon codes to be in the same or adjacent ARTCC's airspace at the same time, a controller may request the pilot to make a code change, squawk standby, or to stop squawk as appropriate.

NOTE-
*Due to the inaccessibility of certain equipment to the flight crews, **code 4400** or a discrete code from the **4400** subset is preset on the ground and will be used throughout the flight profile including operations below FL 600. Controllers should be cognizant that not all aircraft may be able to accept the transponder changes identified in the exception. Emergency **code 7700**, however, can be activated.*

REFERENCE-
FAAO 7110.65, Beacon Identification Methods, Para 5-3-3.

5-2-11. AIR DEFENSE EXERCISE BEACON CODE ASSIGNMENT

EN ROUTE

Ensure exercise FAKER aircraft remain on the exercise flight plan filed discrete beacon code.

NOTE-
1. *NORAD will ensure exercise FAKER aircraft flight plans are filed containing discrete beacon codes from the Department of Defense code allocation specified in FAAO 7610.4, Special Military Operations, Appendix 8.*

2. *NORAD will ensure that those FAKER aircraft assigned the same discrete beacon code are not flight planned in the same or any adjacent ARTCC's airspace at the same time. (Simultaneous assignment of codes will only occur when operational requirements necessitate.)*

REFERENCE-
FAAO 7110.65, Beacon Identification Methods, Para 5-3-3.

5-2-12. STANDBY OR LOW SENSITIVITY OPERATION

You may instruct an aircraft operating on an assigned code to change transponder to "standby" or "low sensitivity" position:

NOTE-
National standards no longer require improved transponder to be equipped with the low sensitivity feature. Therefore, aircraft with late model transponders will be unable to respond to a request to "squawk low."

a. When approximately 15 miles from its destination and you no longer desire operation of the transponder.

b. When necessary to reduce clutter in a multi-target area, or to reduce "ring-around" or other phenomena, provided you instruct the aircraft to return to "normal sensitivity" position as soon as possible thereafter.

PHRASEOLOGY-
SQUAWK STANDBY,

or

SQUAWK LOW/NORMAL.

REFERENCE-
FAAO 7110.65, Beacon Identification Methods, Para 5-3-3.

5-2-13. CODE MONITOR

Continuously monitor the Mode 3/A radar beacon codes assigned for use by aircraft operating within your area of responsibility when nonautomated beacon decoding equipment (e.g., 10-channel decoder) is used to display the target symbol.

REFERENCE-
FAAO 7110.65, Function Code Assignments, Para 5-2-6.

NOTE-
In addition to alphanumeric and control symbology processing enhancements, the M-EARTS, STARS, and the TPX-42 systems are equipped with automatic beacon decoders. Therefore, in facilities where the automatic beacon decoders are providing the control slash video, there is no requirement to have the nonautomated decoding equipment operating simultaneously.

REFERENCE-
FAAO 7210.3, Monitoring of Mode 3/A Radar Beacon Codes, Para 3-7-4.

a. This includes the appropriate IFR code actually assigned and, additionally, **code 1200, code 1255,** and **code 1277** unless your area of responsibility includes only Class A airspace. During periods when ring-around or excessive VFR target presentations derogate the separation of IFR traffic, the monitoring of VFR **code 1200, code 1255, and code 1277** may be temporarily discontinued.

b. Positions of operation which contain a restricted or warning area or VR route within or immediately adjacent to their area of jurisdiction shall monitor **code 4000** and any other code used in lieu of **4000** within the warning/restricted area or VR route. If by local coordination with the restricted/warning area or VR route user a code other than 4000 is to be exclusively used, then this code shall be monitored.

c. If a normally assigned beacon code disappears, check for a response on the following codes in the order listed and take appropriate action:

NOTE-
When codes 7500 and/or 7600 have been preselected, it will be necessary for the ID-SEL-OFF switches for these codes to be left in the off position so that beacon target for an aircraft changing to one of these codes will disappear, thereby alerting the controller to make the check. This check will not be required if automatic alerting capability exists.

1. **Code 7500** (hijack code).

REFERENCE-
FAAO 7110.65, Hijacked Aircraft, Para 10-2-6.

2. **Code 7600** (loss of radio communications code).

5-2-14. FAILURE TO DISPLAY ASSIGNED BEACON CODE OR INOPERATIVE/ MALFUNCTIONING TRANSPONDER

a. Inform an aircraft with an operable transponder that the assigned beacon code is not being displayed.

PHRASEOLOGY-
(Identification) RESET TRANSPONDER, SQUAWK (appropriate code).

b. Inform an aircraft when its transponder appears to be inoperative or malfunctioning.

PHRASEOLOGY-
(Identification) YOUR TRANSPONDER APPEARS INOPERATIVE/MALFUNCTIONING, RESET, SQUAWK (appropriate code).

c. Ensure that the subsequent control position in the facility or the next facility, as applicable, is notified when an aircraft transponder is malfunctioning/inoperative.

REFERENCE-
FAAO 7110.65, Beacon Identification Methods, Para 5-3-3.

5-2-15. INOPERATIVE OR MALFUNCTIONING INTERROGATOR

Inform aircraft concerned when the ground interrogator appears to be inoperative or malfunctioning.

PHRASEOLOGY-
(Name of facility or control function) BEACON INTERROGATOR INOPERATIVE/MALFUNCTIONING.

REFERENCE-
FAAO 7110.65, Radar Use, Para 5-1-3.
FAAO 7110.65, Beacon Identification Methods, Para 5-3-3.

5-2-16. FAILED TRANSPONDER IN CLASS A AIRSPACE

Disapprove a request or withdraw previously issued approval to operate in Class A airspace with a failed transponder solely on the basis of traffic conditions or other operational factors.

REFERENCE-
FAAO 7110.65, Radar Use, Para 5-1-3.
FAAO 7110.65, Beacon Identification Methods, Para 5-3-3.

5-2-17. VALIDATION OF MODE C READOUT

Ensure that Mode C altitude readouts are valid after accepting an interfacility handoff, initial track start, track start from coast/suspend tabular list, missing, or unreasonable Mode C readouts. For TPX-42 and equivalent systems ensure that altitude readout is valid immediately after identification. (TCDD-/BANS-equipped tower cabs are not required to validate Mode C readouts after receiving interfacility handoffs from TRACON's according to the procedures in para 5-4-3, Methods, subpara a4.)

a. Consider an altitude readout valid when:

1. It varies less than 300 feet from the pilot reported altitude, or

PHRASEOLOGY-
(If aircraft is known to be operating below the lowest useable flight level),

SAY ALTITUDE.

or

(If aircraft is known to be operating at or above the lowest useable flight level),

SAY FLIGHT LEVEL.

2. You receive a continuous readout from an aircraft on the airport and the readout varies by less than 300 feet from the field elevation, or

NOTE-
A continuous readout exists only when the altitude filter limits are set to include the field elevation.

REFERENCE-
FAAO 7110.65, Altitude Filters, Para 5-2-23.
FAAO 7110.65, Selected Altitude Limits, Para 5-14-5.
FAAO 7210.3, Display Data, Para 11-2-3.

3. You have correlated the altitude information in your data block with the validated information in a data block generated in another facility (by verbally coordinating with the other controller) and your readout is exactly the same as the readout in the other data block.

b. When unable to validate the readout, do not use the Mode C altitude information for separation.

c. Whenever you observe an invalid Mode C readout below FL 180:

1. Issue the correct altimeter setting and confirm the pilot has accurately reported the altitude.

PHRASEOLOGY-
(Location) ALTIMETER (appropriate altimeter), VERIFY ALTITUDE.

2. If the altitude readout continues to be invalid:

(a) Instruct the pilot to turn off the altitude-reporting part of his/her transponder and include the reason; and

(b) Notify the operations supervisor-in-charge of the aircraft call sign.

PHRASEOLOGY-
STOP ALTITUDE SQUAWK. ALTITUDE DIFFERS BY (number of feet) FEET.

d. Whenever you observe an invalid Mode C readout at or above FL 180, unless the aircraft is descending below Class A airspace:

1. Confirm that the pilot is using 29.92 Hg of mercury as the altimeter setting and has accurately reported the altitude.

PHRASEOLOGY-
CONFIRM USING TWO NINER NINER TWO AS YOUR ALTIMETER SETTING.

(If aircraft is known to be operating at or above the lowest useable flight level),

VERIFY FLIGHT LEVEL.

2. If the Mode C readout continues to be invalid:

(a) Instruct the pilot to turn off the altitude-reporting part of his/her transponder and include the reason; and

(b) Notify the operational supervisor-in-charge of the aircraft call sign.

PHRASEOLOGY-
STOP ALTITUDE SQUAWK. ALTITUDE DIFFERS BY (number of feet) FEET.

e. Whenever possible, inhibit altitude readouts on all consoles when a malfunction of the ground equipment causes repeated invalid readouts.

Section 4. Transfer of Radar Identification

5-4-1. APPLICATION

To provide continuous radar service to an aircraft and facilitate a safe, orderly, and expeditious flow of traffic, it is often necessary to transfer radar identification of an aircraft from one controller to another. This section describes the terms, methods, and responsibilities associated with this task. Interfacility and intrafacility transfers of radar identification shall be accomplished in all areas of radar surveillance except where it is not operationally feasible. Where such constraints exist, they shall be:

a. Covered in letters of agreement which clearly state that control will not be based upon a radar handoff, or

b. Coordinated by the transferring and receiving controllers for a specified period of time.

REFERENCE-
FAAO 7110.65, Coordination with Receiving Facility, Para 4-3-7.

5-4-2. TERMS

a. *Handoff.* An action taken to transfer the radar identification of an aircraft from one controller to another controller if the aircraft will enter the receiving controller's airspace and radio communications with the aircraft will be transferred.

b. *Radar Contact.* The term used to inform the controller initiating a handoff that the aircraft is identified and approval is granted for the aircraft to enter the receiving controller's airspace.

c. *Point Out.* A physical or automated action taken by a controller to transfer the radar identification of an aircraft to another controller if the aircraft will or may enter the airspace or protected airspace of another controller and radio communications will not be transferred.

d. *Point Out Approved.* The term used to inform the controller initiating a point out that the aircraft is identified and that approval is granted for the aircraft to enter the receiving controller's airspace, as coordinated, without a communications transfer or the appropriate automated system response.

e. *Traffic.* A term used to transfer radar identification of an aircraft to another controller for the purpose of coordinating separation action. Traffic is normally issued:

1. In response to a handoff or point out;

2. In anticipation of a handoff or point out; or

3. In conjunction with a request for control of an aircraft.

f. *Traffic Observed.* The term used to inform the controller issuing the traffic restrictions that the traffic is identified and that the restrictions issued are understood and will be complied with.

5-4-3. METHODS

a. Transfer the radar identification of an aircraft by at least one of the following methods:

1. Physically point to the target on the receiving controller's display.

2. Use landline voice communications.

3. Use automation capabilities.

4. *TERMINAL.* Use the "Modify" or "Quick Look" functions for data transfer between the TRACON and tower cab only if specific procedures are established in a facility directive. The local controller has the responsibility to determine whether or not conditions are adequate for the use of ARTS/STARS data on the BRITE/DBRITE/TDW.

REFERENCE-
FAAO 7210.3, Use of Modify and Quick Look Functions, Para 11-2-4.
FAAO 7210.3, Use of Stars Quick Look Functions, Para 11-8-4.

5. *EN ROUTE.* EDARC/HOST or DARC/HOST have interfacility handoff capabilities that can be manually initiated and accepted through the Quick Action Keys (QAK), or used in automatic handoff mode as in HOST Stage A. DARC or EDARC do not have the capabilities for interfacility handoffs. Therefore, handoffs between facilities must be made via landline voice communications when operating in DARC or EDARC.

b. When making a handoff, point-out, or issuing traffic restrictions, relay information to the receiving controller in the following order:

1. The position of the target relative to a fix, map symbol, or radar target known and displayed by both the receiving and transferring controller. Mileage from the reference point may be omitted when relaying the position of a target if a full data block associated with the target has been forced on the receiving controller's radar display.

EXAMPLE-
"Point out, Southwest of Richmond VOR..."

2. The aircraft identification, as follows:

(a) The aircraft call sign, or

(b) The discrete beacon code of the aircraft during interfacility point-outs only, if both the receiving and the transferring controllers agree.

NOTE-
Acceptance of a point-out using the discrete beacon code as the aircraft's identification constitutes agreement.

3. The assigned altitude, appropriate restrictions, and information that the aircraft is climbing or descending, if applicable, except when inter/intrafacility directives ensure that the altitude information will be known by the receiving controller.

NOTE-
1. *When physically pointing to the target, you do not have to state the aircraft position.*

2. *Those en route facilities using host software that provides capability for passing interim altitude shall include the specific operations and procedures for use of this procedure in a LOA between the appropriate facilities.*

PHRASEOLOGY-
HANDOFF/POINT-OUT/TRAFFIC (aircraft position) (aircraft ID),

or

(discrete beacon code point-out only) (altitude, restrictions, and other appropriate information, if applicable).

c. When receiving a handoff, point-out, or traffic restrictions, respond to the transferring controller as follows:

PHRASEOLOGY-
(Aircraft ID) (restrictions, if applicable) RADAR CONTACT,

or

(aircraft ID or discrete beacon code) (restrictions, if applicable) POINT-OUT APPROVED,

or

TRAFFIC OBSERVED,

or

UNABLE (appropriate information, as required).

d. If any doubt as to target identification exists after attempting confirmation in accordance with this section, apply the provisions of para 5-3-5, Questionable Identification.

REFERENCE-
FAAO 7110.65, Validation of Mode C Readout, Para 5-2-17.

5-4-4. TRAFFIC

a. When using the term "traffic" for coordinating separation, the controller issuing traffic shall issue appropriate restrictions.

b. The controller accepting the restrictions shall be responsible to ensure that approved separation is maintained between the involved aircraft.

5-4-5. TRANSFERRING CONTROLLER HANDOFF

The transferring controller shall:

a. Complete a radar handoff prior to an aircraft's entering the airspace delegated to the receiving controller.

REFERENCE-
FAAO 7110.65, Coordinate Use of Airspace, Para 2-1-14.
FAAO 7110.65, Control Transfer, Para 2-1-15.
FAAO 7110.65, Receiving Controller Handoff, Para 5-4-6.

b. Verbally obtain the receiving controller's approval prior to making any changes to an aircraft's flight path, altitude, or data block information while the handoff is being initiated or after acceptance, unless otherwise specified by a LOA or a facility directive.

NOTE-
Those en route facilities using host software that provides capability for passing interim altitude shall include the specific operations and procedures for use of this procedure in a LOA between the appropriate facilities.

c. Ensure that, prior to transferring communications:

1. Potential violations of adjacent airspace and potential conflicts between aircraft in their own area of jurisdiction are resolved.

2. Necessary coordination has been accomplished with all controllers through whose area of jurisdiction the aircraft will pass prior to entering the receiving controller's area of jurisdiction, except when such coordination is the receiving controller's responsibility as stated in para 5-4-6, Receiving Controller Handoff, and unless otherwise specified by a LOA or a facility directive.

3. Restrictions issued to ensure separation are passed to the receiving controller.

Section 5. Radar Separation

5-5-1. APPLICATION

a. Radar separation shall be applied to all RNAV aircraft operating on a random (impromptu) route at or below FL 450.

b. Radar separation may be applied between:

1. Radar identified aircraft.

2. An aircraft taking off and another radar identified aircraft when the aircraft taking off will be radar-identified within 1 mile of the runway end.

3. A radar-identified aircraft and one not radar-identified when either is cleared to climb/descend through the altitude of the other provided:

(a) The performance of the radar system is adequate and, as a minimum, primary radar targets or ASR-9/Full Digital Radar Primary Symbol targets are being displayed on the display being used within the airspace within which radar separation is being applied; and

(b) Flight data on the aircraft not radar-identified indicate it is a type which can be expected to give adequate primary/ASR-9/Full Digital Radar Primary Symbol return in the area where separation is applied; and

(c) The airspace within which radar separation is applied is not less than the following number of miles from the edge of the radar display:

(1) When less than 40 miles from the antenna- *6 miles;*

(2) When 40 miles or more from the antenna- *10 miles;*

(3) Narrowband radar operations- *10 miles;* and

(d) Radar separation is maintained between the radar-identified aircraft and all observed primary, ASR-9/Full Digital Radar Primary Symbol, and secondary radar targets until nonradar separation is established from the aircraft not radar identified; and

(e) When the aircraft involved are on the same relative heading, the radar-identified aircraft is vectored a sufficient distance from the route of the aircraft not radar identified to assure the targets are not superimposed prior to issuing the clearance to climb/descend.

REFERENCE-
FAAO 7110.65, Exceptions, Para 4-1-2.
FAAO 7110.65, Route Use, Para 4-4-1.
FAAO 7110.65, Application, Para 5-3-1.
FAAO 7110.65, Additional Separation for Formation Flights, Para 5-5-8.
FAAO 7110.65, Approach Separation Responsibility, Para 5-9-5.

5-5-2. TARGET SEPARATION

a. Apply radar separation:

1. Between the centers of primary radar targets; however, do not allow a primary target to touch another primary target or a beacon control slash.

2. Between the ends of beacon control slashes.

NOTE-
At TPX-42 sites, the bracket video feature must be activated to display the beacon control slash.

3. Between the end of a beacon control slash and the center of a primary target.

4. All-digital displays. Between the centers of digitized targets. Do not allow digitized targets to touch.

REFERENCE-
FAAO 7110.65, Simultaneous Independent ILS/MLS Approaches- Dual & Triple, Para 5-9-7.

5-5-3. TARGET RESOLUTION

a. A process to ensure that correlated radar targets or digitized targets do not touch.

b. Mandatory traffic advisories and safety alerts shall be issued when this procedure is used.

NOTE-
This procedure shall not be provided utilizing mosaic radar systems.

c. Target resolution shall be applied as follows:

1. Between the edges of two primary targets or the edges of primary digitized targets.

2. Between the end of the beacon control slash and the edge of a primary target or primary digitized target.

3. Between the ends of two beacon control slashes.

5-5-4. MINIMA

Separate aircraft by the following minima:

NOTE-
Wake turbulence procedures specify increased separation minima required for certain classes of aircraft because of the possible effects of wake turbulence.

a. Broadband Radar System or Full Digital Terminal Radar System:

NOTE-
1. *Includes single sensor long range radar mode.*

2. *When less than 40 miles from the antenna- 3 miles.*

3. *When 40 miles or more from the antenna- 5 miles.*

EN ROUTE

b. Stage A/DARC, M-EARTS Mosaic Mode, Terminal Mosaic Mode:

NOTE-
Mosaic Mode combines radar input from 2 to 16 sites into a single picture utilizing a mosaic grid composed of radar sort boxes.

1. Below FL 600- *5 miles.*

2. At or above FL 600- *10 miles.*

3. For areas meeting all of the following conditions:

(a) Radar site adaptation is set to single sensor.

(b) Significant operational advantages can be obtained.

(c) Within 40 miles of the antenna.

(d) Below FL 180.

(e) Facility directives specifically define the area where the separation can be applied. Facility directives may specify 3 miles.

REFERENCE-
FAAO 7210.3, Single Site Coverage Stage A Operations, Para 8-2-1.
FAAO 7210.3, Single Site Coverage ATTS Operations, Para 11-8-15.

4. When transitioning from terminal to en route control, 3 miles increasing to 5 miles or greater, provided:

(a) The aircraft are on diverging routes/courses, and/or

(b) The leading aircraft is and will remain faster than the following aircraft; and

(c) Separation constantly increasing and the first center controller will establish 5 NM or other appropriate form of separation prior to the aircraft departing the first center sector; and

(d) The procedure is covered by a letter of agreement between the facilities involved and limited to specified routes and/or sectors/positions.

c. M-EARTS Sensor Mode:

NOTE-
1. *Sensor Mode displays information from the radar input of a single site.*

2. *Procedures to convert M-EARTS Mosaic Mode to M-EARTS Sensor Mode at each PVD/MDM will be established by facility directive.*

1. When less than 40 miles from the antenna- *3 miles.*

2. When 40 miles or more from the antenna- *5 miles.*

WAKE TURBULENCE APPLICATION

d. Separate aircraft operating directly behind, or directly behind and less than 1,000 feet below, or following an aircraft conducting an instrument approach by:

NOTE-
Consider parallel runways less than 2,500 feet apart as a single runway because of the possible effects of wake turbulence.

1. Heavy behind heavy- *4 miles.*

2. Large/heavy behind B757- *4 miles.*

3. Small behind B757- *5 miles.*

4. Small/large behind heavy - *5 miles.*

WAKE TURBULENCE APPLICATION

e. *TERMINAL.* In addition to subpara d, separate an aircraft landing behind another aircraft on the same runway, or one making a touch-and-go, stop-and-go, or low approach by ensuring the following minima will exist at the time the preceding aircraft is over the landing threshold:

NOTE-
Consider parallel runways less than 2,500 feet apart as a single runway because of the possible effects of wake turbulence.

1. Small behind large- *4 miles.*

2. Small behind B757- *5 miles.*

3. Small behind heavy- *6 miles.*

f. *TERMINAL.* 2.5 nautical miles (NM) separation is authorized between aircraft established on the final approach course within 10 NM of the landing runway when operating in single sensor slant range mode and aircraft remains within 40 miles of the antenna and:

1. The leading aircraft's weight class is the same or less than the trailing aircraft;

2. Heavy aircraft and the Boeing 757 are permitted to participate in the separation reduction as the trailing aircraft only;

3. An average runway occupancy time of 50 seconds or less is documented;

4. CTRD's are operational and used for quick glance references;

REFERENCE-
FAAO 7110.65, Use of Tower Radar Displays, Para 3-1-9.

5. Turnoff points are visible from the control tower.

REFERENCE-
FAAO 7110.65, Wake Turbulence, Para 2-1-19.
FAAO 7110.65, Same Runway Separation, Para 3-9-6.
FAAO 7110.65, Passing or Diverging, Para 5-5-7.
FAAO 7110.65, Separation from Obstructions, Para 5-5-9.
FAAO 7110.65, Successive or Simultaneous Departures, Para 5-8-3.
FAAO 7110.65, Approach Separation Responsibility, Para 5-9-5.
FAAO 7110.65, Sequencing, Para 7-6-7.
FAAO 7110.65, Separation, Para 7-7-3.
FAAO 7110.65 Separation, Para 7-8-3.
FAAO 7210.3, Reduced Separation on Final, Para 10-4-7.

5-5-5. VERTICAL APPLICATION

Aircraft not laterally separated, may be vertically separated by one of the following methods:

a. Assign altitudes to aircraft, provided valid Mode C altitude information is monitored and the applicable separation minima is maintained at all times.

REFERENCE-
FAAO 7110.65, Vertical Separation Minima, Para 4-5-1.
FAAO 7110.65, Validation of Mode C Readout, Para 5-2-17.
FAAO 7110.65, Separation, Para 7-7-3.
FAAO 7110.65, Separation, Para 7-8-3.
FAAO 7110.65, Separation, Para 7-9-4.

b. Assign an altitude to an aircraft after the aircraft previously at that altitude has been issued a climb/descent clearance and is observed (valid Mode C), or reports leaving the altitude.

NOTE-
1. Consider known aircraft performance characteristics, pilot furnished and/or Mode C detected information which indicate that climb/descent will not be consistent with the rates recommended in the AIM.

2. It is possible that the separation minima described in para 4-5-1, Vertical Separation Minima, para 7-7-3, Separation, para 7-8-3, Separation, or para 7-9-4, Separation, might not always be maintained using subpara b. However, correct application of this procedure will ensure that aircraft are safely separated because the first aircraft must have already vacated the altitude prior to the assignment of that altitude to the second aircraft.

REFERENCE-
FAAO 7110.65, Procedural Preference, Para 2-1-3.
FAAO 7110.65, Vertical Separation Minima, Para 4-5-1.
FAAO 7110.65, Validation of Mode C Readout, Para 5-2-17.
FAAO 7110.65, Application, Para 6-6-1.

5-5-6. EXCEPTIONS

a. Do not use Mode C to effect vertical separation with an aircraft on a cruise clearance, contact approach, or as specified in para 5-15-4, System Requirements, subpara e.

REFERENCE-
FAAO 7110.65, Exceptions, Para 6-6-2.
FAAO 7110.65, Contact Approach, Para 7-4-6.
P/CG Term- Cruise.

b. Assign an altitude to an aircraft only after the aircraft previously at that altitude is observed at or passing through another altitude separated from the first by the appropriate minima when:

1. Severe turbulence is reported.

2. Aircraft are conducting military aerial refueling.

REFERENCE-
FAAO 7110.65, Military Aerial Refueling, Para 9-3-10.

3. The aircraft previously at that altitude has been issued a climb/descent at pilot's discretion.

5-5-7. PASSING OR DIVERGING

a. *TERMINAL.* Vertical separation between aircraft may be discontinued when the following conditions are met:

1. Aircraft are on opposite/reciprocal courses and you have observed that they have passed each other; or aircraft are on same or crossing courses and one aircraft has crossed the projected course of the other and the angular difference between their courses is at least 15 degrees.

2. The tracks are monitored to ensure that the primary targets, beacon control slashes, or full digital terminal system primary and/ or beacon target symbols will not touch.

REFERENCE-
FAAO 7110.65, Course Definitions, Para 1-2-2.

b. *EN ROUTE.* Vertical separation between aircraft may be discontinued when they are on opposite courses as defined in para 1-2-2, Course Definitions; and

1. You are in communications with both aircraft involved; and

2. You tell the pilot of one aircraft about the other aircraft, including position, direction, type; and

3. One pilot reports having seen the other aircraft and that the aircraft have passed each other; and

4. You have observed that the radar targets have passed each other; and

5. You have advised the pilots if either aircraft is classified as a heavy jet/B757 aircraft.

6. Although vertical separation may be discontinued, the requirements of para 5-5-4, Minima, subparas d and e must be applied when operating behind a heavy jet/B757.

EXAMPLE-
"Traffic, twelve o'clock, Boeing Seven Twenty Seven, opposite direction. Do you have it in sight?"

(If the answer is in the affirmative):

"Report passing the traffic."

(When pilot reports passing the traffic and the radar targets confirm that the traffic has passed, issue appropriate control instructions.)

5-5-8. ADDITIONAL SEPARATION FOR FORMATION FLIGHTS

Because of the distance allowed between formation aircraft and lead aircraft, additional separation is necessary to ensure the periphery of the formation is adequately separated from other aircraft, adjacent airspace, or obstructions. Provide supplemental separation for formation flights as follows:

a. Separate a standard formation flight by adding 1 mile to the appropriate radar separation minima.

REFERENCE-
FAAO 7110.65, Formation Flights, Para 2-1-13.
FAAO 7110.65, Application, Para 5-5-1.
FAAO 7110.65, Separation, Para 7-7-3.
P/CG Term- Formation Flight.

b. Separate two standard formation flights from each other by adding 2 miles to the appropriate separation minima.

c. Separate a nonstandard formation flight by applying the appropriate separation minima to the perimeter of the airspace encompassing the nonstandard formation or from the outermost aircraft of the nonstandard formation whichever applies.

d. If necessary for separation between a nonstandard formation and other aircraft, assign an appropriate beacon code to each aircraft in the formation or to the first and last aircraft in-trail.

NOTE-
The additional separation provided in para 5-5-8, Additional Separation for Formation Flights, is not normally added to wake turbulence separation when a formation is following a heavier aircraft since none of the formation aircraft are likely to be closer to the heavier aircraft than the lead aircraft (to which the prescribed wake turbulence separation has been applied).

REFERENCE-
FAAO 7110.65, Military Aerial Refueling, Para 9-3-10.

5-5-9. SEPARATION FROM OBSTRUCTIONS

a. Except in En Route Stage A/DARC or Stage A/EDARC, separate aircraft from prominent obstructions depicted on the radar scope (displayed on the video/geo map, scribed on the map overlay, or displayed as a permanent echo) by the following minima:

1. When less than 40 miles from the antenna- *3 miles.*

2. When 40 miles or more from the antenna- *5 miles.*

b. Except in En Route Stage A/DARC or Stage A/EDARC, vertical separation of aircraft above a prominent obstruction displayed as a permanent echo may be discontinued after the aircraft has passed it.

c. En Route Stage A/DARC or Stage A/EDARC, apply the radar separation minima specified in para 5-5-4, Minima, subpara b1.

NOTE-
The determination of what constitutes a prominent obstruction is made locally after coordination with appropriate flight standards representatives. Prominent obstructions shall be displayed as permanent echoes on the radar display using parrots, MTI reflectors, or RTQC symbols. Digital map mark (DMM) may be used to mark obstructions. DMM's are not to be used alone for map alignment but in conjunction with one or more of the permanent echo marking devices. When RTQC alone is used for obstruction marking, it shall be certified by airway facilities per the appropriate certification manual.

5-5-10. ADJACENT AIRSPACE

a. If coordination between the controllers concerned has not been effected, separate radar-controlled aircraft from the boundary of adjacent airspace in which radar separation is also being used by the following minima:

REFERENCE-
FAAO 7110.65, Coordinate Use of Airspace, Para 2-1-14.

1. When less than 40 miles from the antenna- *1 1/2 miles.*

2. When 40 miles or more from the antenna- *2 1/2 miles.*

3. En route Stage A/DARC or Stage A/EDARC:

(a) Below Flight Level 600- *2 1/2 miles.*

(b) Flight Level 600 and above- *5 miles.*

b. Separate radar-controlled aircraft from the boundary of airspace in which nonradar separation is being used by the following minima:

1. When less than 40 miles from the antenna- *3 miles.*

2. When 40 miles or more from the antenna- *5 miles.*

3. En route Stage A/DARC or Stage A/EDARC:

(a) Below Flight Level 600- *5 miles.*

(b) Flight Level 600 and above- *10 miles.*

c. The provisions of subparas a and b do not apply to VFR aircraft being provided Class B, Class C, or TRSA services. Ensure that the targets of these aircraft do not touch the boundary of adjacent airspace.

d. VFR aircraft approaching Class B, Class C, Class D, or TRSA airspace which is under the control jurisdiction of another air traffic control facility should either be provided with a radar handoff or be advised that radar service is terminated, given their position in relation to the Class B, Class C, Class D, or TRSA airspace, and the ATC frequency, if known, for the airspace to be entered. These actions should be accomplished in sufficient time for the pilot to obtain the required ATC approval prior to entering the airspace involved, or to avoid the airspace.

5-5-11. EDGE OF SCOPE

Separate a radar-controlled aircraft climbing or descending through the altitude of an aircraft that has been tracked to the edge of the scope/display by the following minima until nonradar separation has been established:

a. When less than 40 miles from the antenna- *3 miles* from edge of scope.

b. When 40 miles or more from the antenna- *5 miles* from edge of scope.

c. En route Stage A/DARC or Stage A/EDARC:

1. Below Flight Level 600- *5 miles.*

2. Flight Level 600 and above- *10 miles.*

5-5-12. BEACON TARGET DISPLACEMENT

When using a radar target display with a previously specified beacon target displacement to separate a beacon target from a primary target, adjacent airspace, obstructions, or terrain, add a 1 mile correction factor to the applicable minima. The maximum allowable beacon target displacement which may be specified by the facility air traffic manager is 1/2 mile.

REFERENCE-
FAAO 7210.3, Monitoring of Mode 3/A Radar Beacon Codes, Para 3-7-4.

5-5-13. GPA 102/103 CORRECTION FACTOR

When using a radar display whose primary radar video is processed by the GPA 102/103 modification to a joint-use radar system, apply the following correction factors to the applicable minima:

a. If less than 40 miles from the antenna- add *1 mile.*

b. If 40 miles or more but not over 200 miles from the antenna- add *3 miles.*

Section 8. Radar Departures

5-8-1. PROCEDURES

Use standard departure routes and channelized altitudes whenever practical to reduce coordination. Do not, however, assign these routes solely to provide for possible radar or communication failure.

5-8-2. INITIAL HEADING

Before departure, assign the initial heading to be flown if a departing aircraft is to be vectored immediately after takeoff.

PHRASEOLOGY-
FLY RUNWAY HEADING.
TURN LEFT/RIGHT, HEADING (degrees).

NOTE-
TERMINAL. A purpose for the heading is not necessary, since pilots operating in a radar environment associate assigned headings with vectors to their planned route of flight.

REFERENCE-
FAAO 7110.65, Departure Clearances, Para 4-3-2.
FAAO 7110.65, Vectors Below Minimum Altitude, Para 5-6-3.

5-8-3. SUCCESSIVE OR SIMULTANEOUS DEPARTURES

TERMINAL

Separate aircraft departing from the same airport/heliport or adjacent airports/heliports in accordance with the following minima provided radar identification with the aircraft will be established within 1 mile of the takeoff runway end/helipad and courses will diverge by 15 degrees or more.

NOTE-
1. *FAAO 8260.19, Flight Procedures and Airspace, establishes guidelines for IFR departure turning procedures which assumes a climb to 400 feet above the airport elevation before a turn is commenced. FAAO 8260.3, United States Standard for Terminal Instrument Procedures (TERPS), the ILS missed approach criteria, requires a straight climb of 400 feet be specified where turns greater than 15 degrees are required.*

2. *Consider known aircraft performance characteristics when applying initial separation to successive departing aircraft.*

3. *When one or both of the departure surfaces is a helipad, use the takeoff course of the helicopter as a reference, comparable to the centerline of a runway and the helipad center as the threshold.*

a. Between aircraft departing the same runway/helipad or parallel runways/helicopter takeoff courses separated by less than 2,500 feet- *1 mile* if courses diverge immediately after departure.
(See FIG 5-8-1, FIG 5-8-2, and FIG 5-8-3.)

Successive Departures

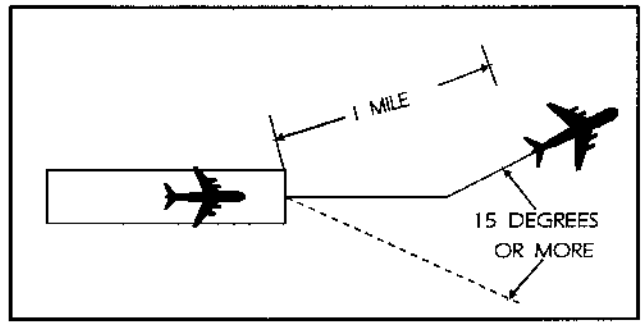


FIG 5-8-1

Simultaneous Departures

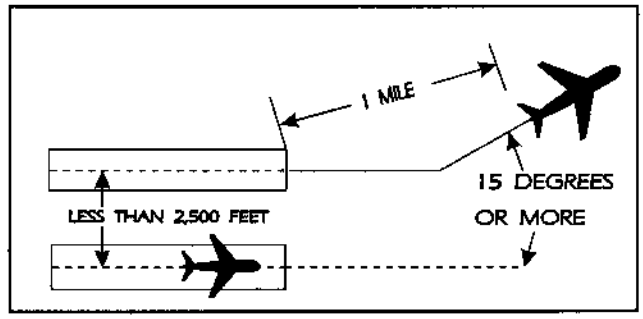


FIG 5-8-2

Simultaneous Departures

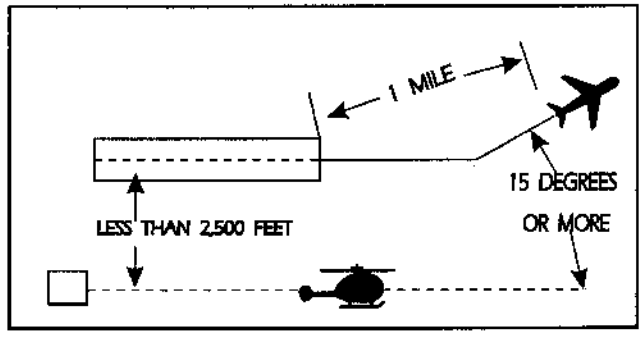


FIG 5-8-3

NOTE-
This procedure does not apply when a small aircraft is taking off from an intersection on the same runway behind a large aircraft or when an aircraft is departing behind a heavy jet/B757.

REFERENCE-
FAAO 7110.65, Wake Turbulence Separation for Intersection Departures, Para 3-9-7.
FAAO 7110.65, Intersecting Runway Separation, Para 3-9-8.
FAAO 7110.65, Minima, Para 5-5-4.

b. Between aircraft departing from diverging runways:

1. Nonintersecting runways. Authorize simultaneous takeoffs if runways diverge by 15 degrees or more. (See FIG 5-8-4.)

Nonintersecting Runway Departures

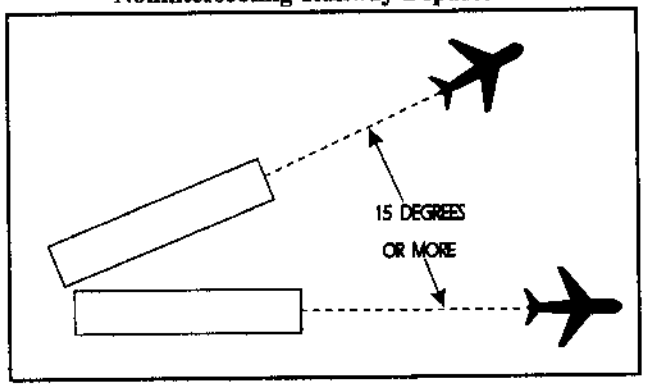


FIG 5-8-4

2. Intersecting runways and/or helicopter takeoff courses which diverge by 15 degrees or more. Authorize takeoff of a succeeding aircraft when the preceding aircraft has passed the point of runway and/or takeoff course intersection. When applicable, apply the procedure in para 3-9-5, Anticipating Separation. (See FIG 5-8-5 and FIG 5-8-6.)

Intersecting Runway Departures

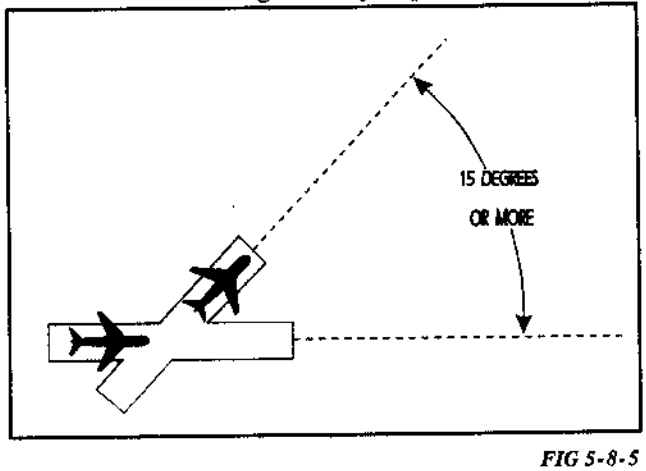


FIG 5-8-5

NOTE-
This procedure does not apply when aircraft are departing behind a heavy jet/B757.

c. Between aircraft departing in the same direction from parallel runways/helicopter takeoff courses. Authorize simultaneous takeoffs if the centerlines/takeoff courses are separated by at least 2,500 feet and courses diverge by 15 degrees or more immediately after departure. (See FIG 5-8-7 and FIG 5-8-8.)

Intersecting Helicopter Course Departures

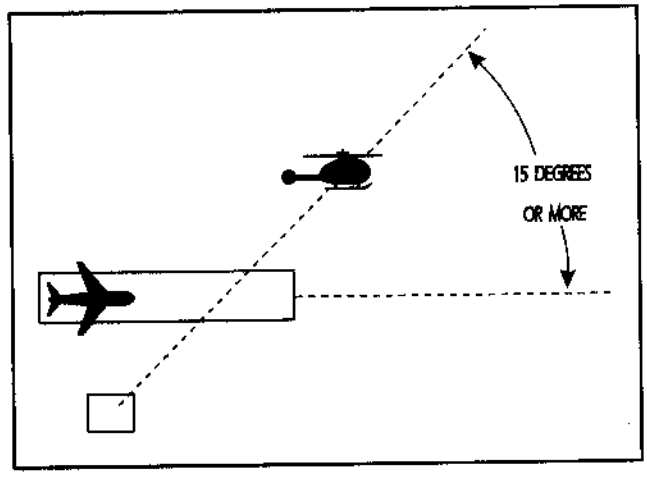


FIG 5-8-6

Parallel Runway Departures

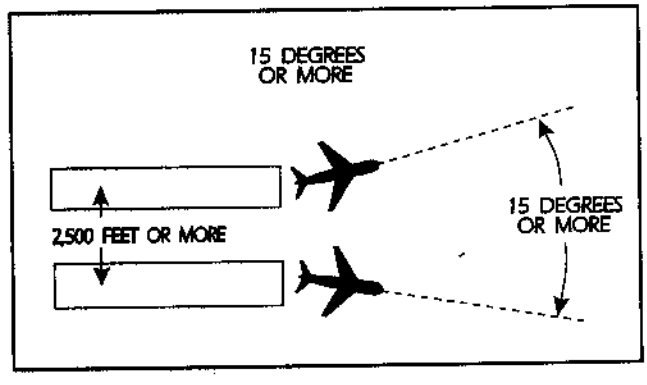


FIG 5-8-7

Parallel Helicopter Course Departures

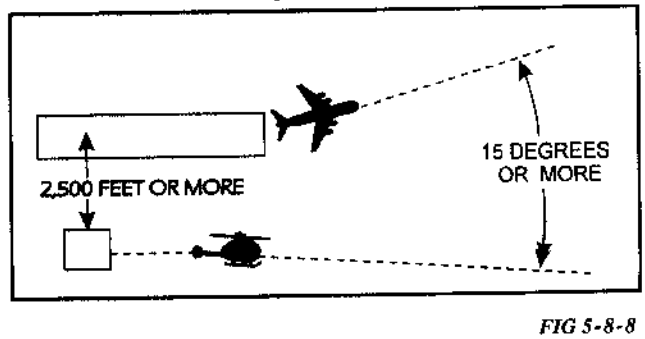


FIG 5-8-8

3. *Aircraft 3 is being vectored to intercept the final approach course beyond the approach segments, 5 miles from Alpha at 5,000 feet. the MVA for this area is 4,000 feet. "Five miles from Alpha. Turn right heading three three zero. Cross Alpha at or above four thousand. Cleared I-L-S runway three six approach." (See FIG 5-9-1.)*

4. *Aircraft 4 is established on the final approach course beyond the approach segments, 8 miles from Alpha at 6,000 feet. The MVA for this area is 4,000 feet. "Eight miles from Alpha. Cross Alpha at or above four thousand. Cleared I-L-S runway three six approach." (See FIG 5-9-1.)*

Arrival Instructions

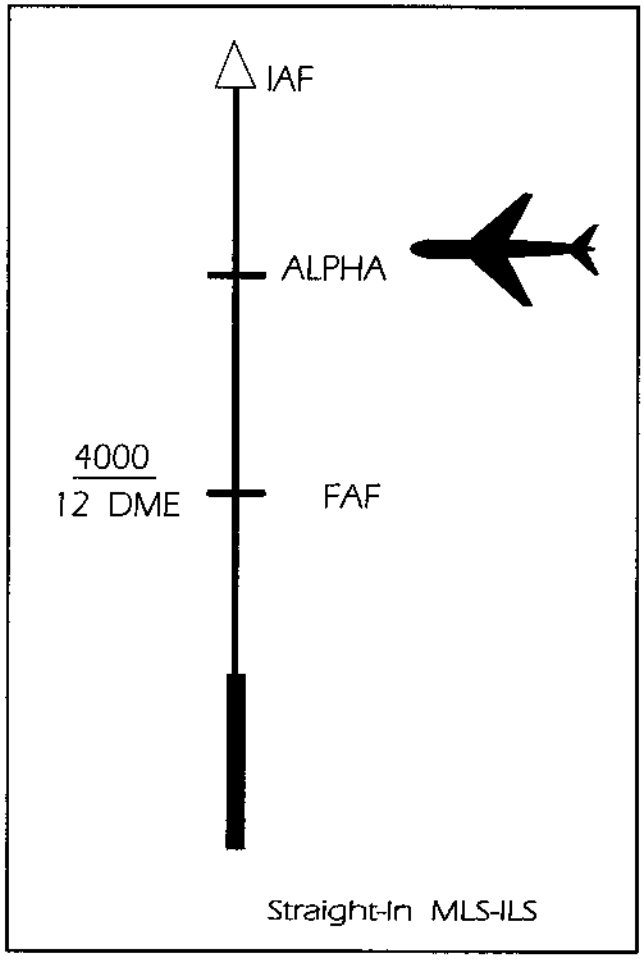


FIG 5-9-2

EXAMPLE-
The aircraft is being vectored to a published segment of the MLS final approach course, 3 miles from Alpha at 4,000 feet. The MVA for this area is 4,000 feet. "Three miles from Alpha. Turn left heading two one zero. Maintain four thousand until established on the azimuth course. Cleared M-L-S runway one eight approach." (See FIG 5-9-2.)

Arrival Instructions

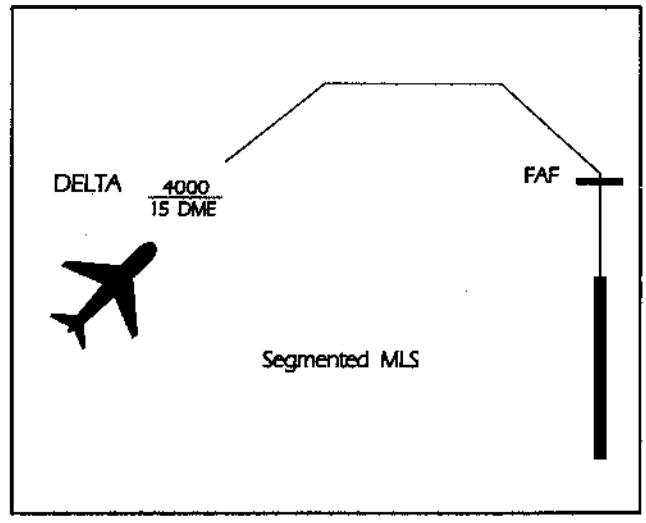


FIG 5-9-3

EXAMPLE-
The aircraft is en route to Delta waypoint at 6,000 feet. The MVA for this area is 4,000 feet. "Cross Delta at or above four thousand. Cleared M-L-S runway one eight approach." (See FIG 5-9-3.)

Arrival Instructions

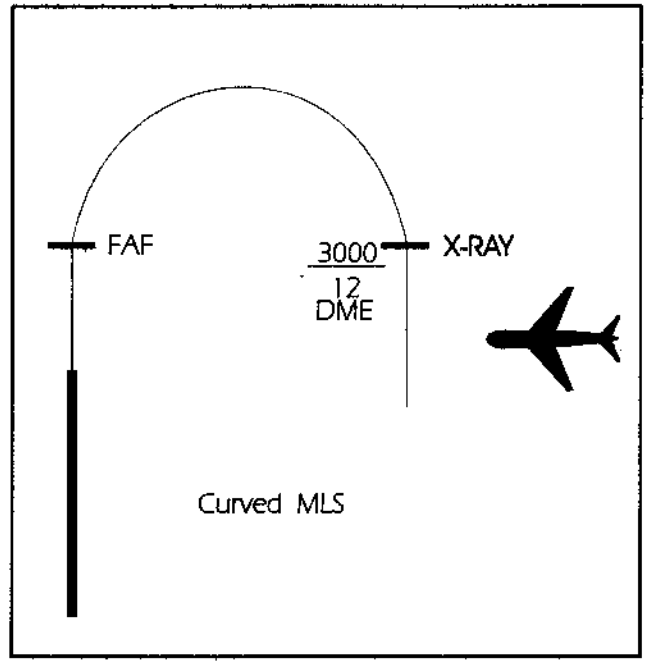


FIG 5-9-4

EXAMPLE-
The aircraft is being vectored to an MLS curved approach, 3 miles from X-ray at 3,000 feet. "Three miles from X-ray. Turn right heading three three zero. Maintain three thousand until established on the azimuth course. Cleared M-L-S runway one eight approach." (See FIG 5-9-4.)

NOTE-
1. The altitude assigned must assure IFR obstruction clearance from the point at which the approach clearance is issued until established on a segment of a published route or instrument approach procedure.

2. If the altitude assignment is VFR-on-top, it is conceivable that the pilot may elect to remain high until arrival over the final approach fix which may require the pilot to circle to descend so as to cross the final approach fix at an altitude that would permit landing.

d. Instructions to do one of the following:

NOTE-
The principal purpose of this paragraph is to ensure that frequency changes are made prior to passing the final approach fix. However, at times it will be desirable to retain an aircraft on the approach control frequency to provide a single-frequency approach or other radar services. When this occurs, it will be necessary to relay tower clearances or instructions to preclude changing frequencies prior to landing or approach termination.

1. Monitor local control frequency, reporting to the tower when over the approach fix.

2. Contact the tower on local control frequency.

REFERENCE-
FAAO 7110.65, Communications Release, Para 4-8-8.

3. Contact the final controller on the appropriate frequency if radar service will be provided on final on a different frequency.

REFERENCE-
FAAO 7110.65, Final Controller Changeover, Para 5-10-8.

4. When radar is used to establish the final approach fix, inform the pilot that after being advised that he/she is over the fix he/she is to contact the tower on local control frequency.

EXAMPLE-
"Three miles from final approach fix. Turn left heading zero one zero. Maintain two thousand until established on the localizer. Cleared I-L-S runway three six approach. I will advise when over the fix."

"Over final approach fix. Contact tower one one eight point one."

NOTE-
ARSR may be used for establishment of initial approach and intermediate approach fixes only. ASR must be used to establish the final approach fix.

REFERENCE-
FAAO 7110.65, Final Approach Course Interception, Para 5-9-2.
FAAO 7110.65, Simultaneous Independent ILS/MLS Approaches- Dual & Triple, Para 5-9-7.

e. Where a Terminal Arrival Area (TAA) has been established to support RNAV approaches, inform the aircraft of its position relative to the appropriate IAF and issue the approach clearance. (See FIG 5-9-5.)

EXAMPLE-
1. Aircraft 1: The aircraft is in the straight in area of the TAA. "Seven miles from CENTR, Cleared R-NAV Runway One Eight Approach."

2. Aircraft 2: The aircraft is in the left base area of the TAA. "Fifteen miles from LEFTT, Cleared GPS Runway One Eight Approach."

3. Aircraft 3: The aircraft is in the right base area of the TAA. "Four miles from WRITE, Cleared FMS Runway One Eight Approach."

5-9-5. APPROACH SEPARATION RESPONSIBILITY

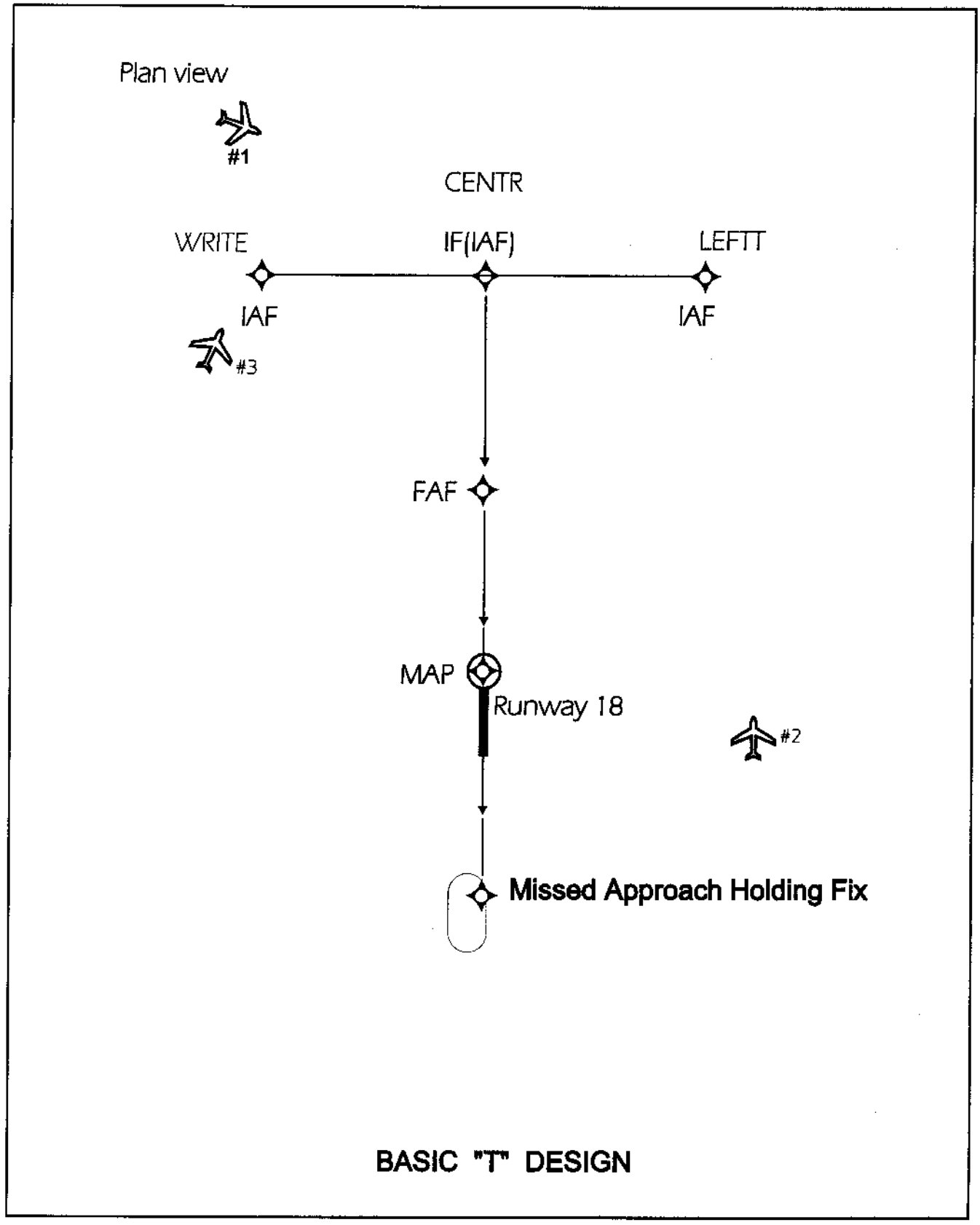
a. The radar controller performing the approach control function is responsible for separation of radar arrivals unless visual separation is provided by the tower, or a letter of agreement/facility directive authorizes otherwise. Radar final controllers ensure that established separation is maintained between aircraft under their control and other aircraft established on the same final approach course.

NOTE-
The radar controller may be a controller in an ARTCC, a terminal facility, or a tower controller when authorized to perform the approach control function in a terminal area.

REFERENCE-
FAAO 7110.65, Wake Turbulence, Para 2-1-19.
FAAO 7110.65, Section 5, Radar Separation, Application, Para 5-5-1.
FAAO 7110.65, Visual Separation, Para 7-2-1.
FAAO 7110.65, Minima, Para 5-5-4.
FAAO 7210.3, Authorization for Separation Services by Towers, Para 2-1-14.

b. When timed approaches are being conducted, the radar controller shall maintain the radar separation specified in para 6-7-5, Interval Minima, until the aircraft is observed to have passed the final approach fix inbound (nonprecision approaches) or the OM or the fix used in lieu of the outer marker (precision approaches) and is within 5 miles of the runway on the final approach course or until visual separation can be provided by the tower.

REFERENCE-
FAAO 7110.65, Receiving Controller Handoff, Para 5-4-6.
FAAO 7110.65, Final Approach Course Interception, Para 5-9-2.
FAAO 7110.65, Parallel Dependent ILS/MLS Approaches, Para 5-9-6.
FAAO 7110.65, Approach Sequence, Para 6-7-2.



BASIC "T" DESIGN

FIG 5-9-5

5-9-6. PARALLEL DEPENDENT ILS/MLS APPROACHES

TERMINAL

a. Apply the following minimum separation when conducting parallel dependent ILS, MLS, or ILS and MLS approaches:

1. Provide a minimum of 1,000 feet vertical or a minimum of 3 miles radar separation between aircraft during turn on.

2. Provide a minimum of 1.5 miles radar separation diagonally between successive aircraft on adjacent localizer/azimuth courses when runway centerlines are at least 2,500 feet but no more than 4,300 feet apart.

Parallel Dependent ILS/MLS Approaches

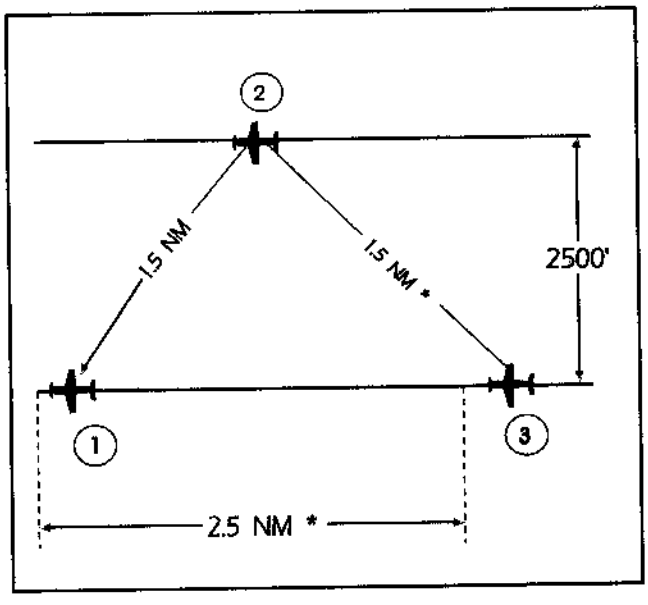


FIG 5-9-6

EXAMPLE-
In FIG 5-9-6, Aircraft 2 is 1.5 miles from Aircraft 1, and Aircraft 3 is 1.5 miles or more from Aircraft 2. The resultant separation between Aircrafts 1 and 3 is at least 2.5 miles.

3. Provide a minimum of 2 miles radar separation diagonally between successive aircraft on adjacent localizer/azimuth courses where runway centerlines are more than 4,300 feet but no more than 9,000 feet apart.

Parallel Dependent ILS/MLS Approaches

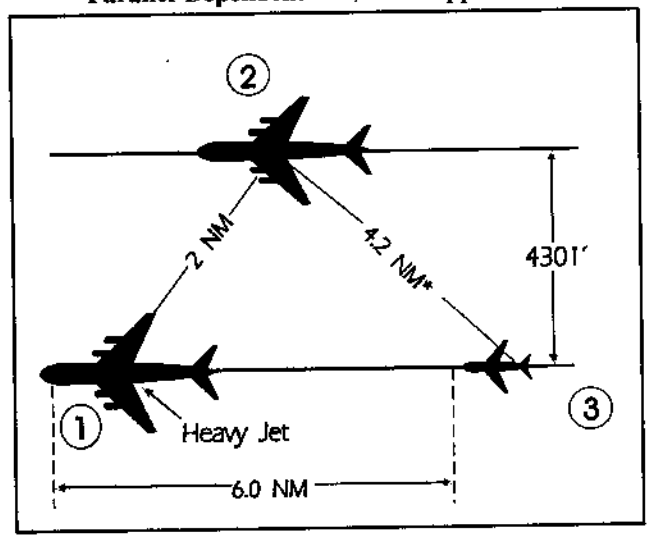


FIG 5-9-7

EXAMPLE-
*In FIG 5-9-7, Aircraft 2 is 2 miles from heavy Aircraft 1. Aircraft 3 is a small aircraft and is 6 miles from Aircraft 1. *The resultant separation between Aircrafts 2 and 3 is 4.2 miles.*

4. Provide the minimum applicable radar separation between aircraft on the same final approach course.

REFERENCE-
FAAO 7110.65, Section 5, Radar Separation, Minima, Para 5-5-4.

b. The following conditions are required when applying the minimum radar separation on adjacent localizer/azimuth courses allowed in subpara a:

1. Apply this separation standard only after aircraft are established on the parallel final approach course.

2. Straight-in landings will be made.

3. Missed approach procedures do not conflict.

4. Aircraft are informed that approaches to both runways are in use. This information may be provided through the ATIS.

5. Approach control shall have the interphone capability of communicating directly with the local controller at locations where separation responsibility has not been delegated to the tower.

NOTE-
The interphone capability is an integral part of this procedure when approach control has the sole separation responsibility.

REFERENCE-
FAAO 7110.65, Approach Separation Responsibility, Para 5-9-5.
FAAO 7210.3, Authorization for Separation Services by Towers, Para 2-1-14.

c. Consideration should be given to known factors that may in any way affect the safety of the instrument approach phase of flight, such as surface wind direction and velocity, wind shear alerts/reports, severe weather activity, etc. Closely monitor weather activity that could impact the final approach course. Weather conditions in the vicinity of the final approach course may dictate a change of approach in use.

REFERENCE-
FAAO 7110.65, Final Approach Course Interception, Para 5-9-2.

5-9-7. SIMULTANEOUS INDEPENDENT ILS/MLS APPROACHES- DUAL & TRIPLE

TERMINAL

a. Apply the following minimum separation when conducting simultaneous independent ILS, MLS, or ILS and MLS approaches:

1. Provide a minimum of 1,000 feet vertical or a minimum of 3 miles radar separation between aircraft during turn-on to parallel final approach.

NOTE-
1. *During triple parallel approaches, no two aircraft will be assigned the same altitude during turn-on. All three aircraft will be assigned altitudes which differ by a minimum of 1,000 feet. Example: 3,000, 4,000, 5,000; 7,000, 8,000, 9,000.*

2. *Communications transfer to the tower controller's frequency shall be completed prior to losing vertical separation between aircraft.*

2. Dual parallel runway centerlines are at least 4,300 feet apart.

3. Triple parallel runway centerlines are at least 5,000 feet apart and the airport field elevation is less than 1,000 feet MSL.

4. A high-resolution color monitor with alert algorithms, such as the final monitor aid or that required in the precision runway monitor program shall be used to monitor approaches where:

(a) Triple parallel runway centerlines are at least 4,300 but less than 5,000 feet apart and the airport field elevation is less than 1,000 feet MSL.

(b) Triple parallel approaches to airports where the airport field elevation is 1,000 feet MSL or more require the high resolution color monitor with alert algorithms and an approved FAA aeronautical study.

5. Provide the minimum applicable radar separation between aircraft on the same final approach course.

REFERENCE-
FAAO 7110.65, Minima, Para 5-5-4.

b. The following conditions are required when applying the minimum separation on adjacent dual or triple ILS/MLS courses allowed in subpara a:

1. Straight-in landings will be made.

2. ILS, MLS, radar, and appropriate frequencies are operating normally.

3. Inform aircraft that simultaneous ILS/MLS approaches are in use prior to aircraft departing an outer fix. This information may be provided through the ATIS.

4. Clear the aircraft to descend to the appropriate glideslope/glidepath intercept altitude soon enough to provide a period of level flight to dissipate excess speed. Provide at least 1 mile of straight flight prior to the final approach course intercept.

NOTE-
Not applicable to curved and segmented MLS approaches.

5. An NTZ at least 2,000 feet wide is established an equal distance between extended runway final approach courses and shall be depicted on the monitor display. The primary responsibility for navigation on the final approach course rests with the pilot. Control instructions and information are issued only to ensure separation between aircraft and to prevent aircraft from penetrating the NTZ.

6. Monitor all approaches regardless of weather. Monitor local control frequency to receive any aircraft transmission. Issue control instructions as necessary to ensure aircraft do not enter the NTZ.

NOTE-
1. *Separate monitor controllers, each with transmit/receive and override capability on the local control frequency, shall ensure aircraft do not penetrate the depicted NTZ. Facility directives shall define responsibility for providing the minimum applicable longitudinal separation between aircraft on the same final approach course.*

2. *The aircraft is considered the center of the primary radar return for that aircraft, or, if an FMA or other color final monitor aid is used, the center of the digitized target of that aircraft, for the purposes of ensuring an aircraft does not penetrate the NTZ. The provisions of para 5-5-2, Target Separation, apply also.*

c. The following procedures shall be used by the final monitor controllers:

1. Instruct the aircraft to return to the correct final approach course when aircraft are observed to overshoot the turn-on or to continue on a track which will penetrate the NTZ.

PHRASEOLOGY-
YOU HAVE CROSSED THE FINAL APPROACH COURSE. TURN (left/right) IMMEDIATELY AND RETURN TO LOCALIZER/AZIMUTH COURSE,

or

TURN (left/right) AND RETURN TO THE LOCALIZER/AZIMUTH COURSE.

2. Instruct aircraft on the adjacent final approach course to alter course to avoid the deviating aircraft when an aircraft is observed penetrating or in the controller's judgement will penetrate the NTZ.

PHRASEOLOGY-
TRAFFIC ALERT, (call sign), TURN (right/left) IMMEDIATELY HEADING (degrees), CLIMB AND MAINTAIN (altitude).

3. Terminate radar monitoring when one of the following occurs:

(a) Visual separation is applied.

(b) The aircraft reports the approach lights or runway in sight.

(c) The aircraft is 1 mile or less from the runway threshold, if procedurally required and contained in facility directives.

4. Do not inform the aircraft when radar monitoring is terminated.

5. Do not apply the provisions of para 5-13-1, Monitor on PAR Equipment, for simultaneous ILS, MLS, or ILS and MLS approaches.

d. Consideration should be given to known factors that may in any way affect the safety of the instrument approach phase of flight when simultaneous ILS, MLS, or ILS and MLS approaches are being conducted to parallel runways. Factors include but are not limited to wind direction/velocity, wind-shear alerts/reports, severe weather activity, etc. Closely monitor weather activity that could impact the final approach course. Weather conditions in the vicinity of the final approach course may dictate a change of approach in use.

REFERENCE-
FAAO 7110.65, Radar Service Termination, Para 5-1-13.
FAAO 7110.65, Final Approach Course Interception, Para 5-9-2.

5-9-8. SIMULTANEOUS INDEPENDENT DUAL ILS/MLS APPROACHES- HIGH UPDATE RADAR

TERMINAL

a. Authorize simultaneous independent ILS, MLS, or ILS and MLS approaches to parallel dual runways with centerlines separated by at least 3,000 feet with one localizer offset by 2.5 degrees using a precision runway monitor system with a 1.0 second radar update system and when centerlines are separated by 3,400 to 4,300 feet when precision runway monitors are utilized with a radar update rate of 2.4 seconds or less; and

1. Provide a minimum of 1,000 feet vertical or a minimum of 3 miles radar separation between aircraft during turn-on to parallel final approach.

NOTE-
Communications transfer to the tower controller's frequency shall be completed prior to losing vertical separation between aircraft.

2. Provide the minimum applicable radar separation between aircraft on the same final approach course.

REFERENCE-
FAAO 7110.65, Minima, Para 5-5-4.

b. The following conditions are required when applying the minimum separation on dual ILS/MLS courses allowed in subpara a:

1. Straight-in landings will be made.

2. ILS, MLS, radar, and appropriate frequencies are operating normally.

3. Inform aircraft that closely spaced simultaneous ILS/MLS approaches are in use prior to aircraft departing an outer fix. This information may be provided through the ATIS.

4. Clear the aircraft to descend to the appropriate glideslope/glidepath intercept altitude soon enough to provide a period of level flight to dissipate excess speed. Provide at least 1 mile of straight flight prior to the final approach course intercept.

NOTE-
Not applicable to curved and segmented MLS approaches.

5. An NTZ at least 2,000 feet wide is established an equal distance between extended runway final approach courses and shall be depicted on the monitor display. The primary responsibility for navigation on the final approach course rests with the pilot. Control instructions and information are issued only to ensure separation between aircraft and to prevent aircraft from penetrating the NTZ.

Section 2. Visual Separation

7-2-1. VISUAL SEPARATION

Aircraft may be separated by visual means, as provided in this paragraph, when other approved separation is assured before and after the application of visual separation. To ensure that other separation will exist, consider aircraft performance, wake turbulence, closure rate, routes of flight, and known weather conditions. Reported weather conditions must allow the aircraft to remain within sight until other separation exists. Do not apply visual separation between successive departures when departure routes and/or aircraft performance preclude maintaining separation.

REFERENCE-
FAAO 7110.65, Wake Turbulence Cautionary Advisories, Para 2-1-20.
FAAO 7110.65, Traffic Advisories, Para 2-1-21.
FAAO 7110.65, Use of Tower Radar Displays, Para 3-1-9.
FAAO 7110.65, Approach Separation Responsibility, Para 5-9-5.
FAAO 7110.65, Visual Approach, Para 7-4-1.
FAAO 7110.65, Vectors for Visual Approach, Para 7-4-2.
FAAO 7110.65, Approaches to Multiple Runways, Para 7-4-4.
P/CG Term- Visual Approach.
P/CG Term- Visual Separation.

a. *TERMINAL.* Visual separation may be applied between aircraft under the control of the same facility within the terminal area up to but not including FL 180, provided:

1. Communication is maintained with at least one of the aircraft involved or the capability to communicate immediately as prescribed in para 3-9-3, Departure Control Instructions, subpara a2 is available, and:

2. The aircraft are visually observed by the tower and visual separation is maintained between the aircraft by the tower. The tower shall not provide visual separation between aircraft when wake turbulence separation is required or when the lead aircraft is a B757.

3. A pilot sees another aircraft and is instructed to maintain visual separation from the aircraft as follows:

(a) Tell the pilot about the other aircraft including position, direction and, unless it is obvious, the other aircraft's intention.

(b) Obtain acknowledgment from the pilot that the other aircraft is in sight.

(c) Instruct the pilot to maintain visual separation from that aircraft.

(d) Advise the pilot if the radar targets appear likely to converge.

NOTE-
Issue this advisory in conjunction with the instruction to maintain visual separation, or thereafter if the controller subsequently becomes aware that the targets are merging.

(e) If the aircraft are on converging courses, inform the other aircraft of the traffic and that visual separation is being applied.

PHRASEOLOGY-
TRAFFIC, (clock position and distance), (direction)-BOUND, (type of aircraft), (intentions and other relevant information).

If applicable,

ON CONVERGING COURSE.

DO YOU HAVE IT IN SIGHT?

If the answer is in the affirmative,

MAINTAIN VISUAL SEPARATION FROM THAT TRAFFIC.

If aircraft are on converging courses, advise the other aircraft:

TRAFFIC, (clock position and distance), (direction)-BOUND, (type of aircraft), HAS YOU IN SIGHT AND WILL MAINTAIN VISUAL SEPARATION.

b. *EN ROUTE.* You may use visual separation in conjunction with visual approach procedures. Visual separation may also be used up to but not including FL 180 when the following conditions are met:

1. Direct communication is maintained with one of the aircraft involved and there is an ability to communicate with the other.

2. A pilot sees another aircraft and is instructed to maintain visual separation from it as follows:

(a) Tell the pilot about the other aircraft including position, direction and unless it is obvious, the other aircraft's intentions.

(b) Obtain acknowledgment from the pilot that the other aircraft is in sight.

(c) Instruct the pilot to maintain visual separation from that aircraft.

(d) Advise the pilot if the radar targets appear likely to converge.

(e) If the aircraft are on converging courses, inform the other aircraft of the traffic and that visual separation is being applied.

(f) Advise the pilots if either aircraft is a heavy.

(g) Traffic advisories and wake turbulence cautionary advisories shall be issued in accordance with para 2-1-20, Wake Turbulence Cautionary Advisories, and para 2-1-21, Traffic Advisories.

REFERENCE-
FAAO 7110.65, Visual Approach, Para 7-4-1.
FAAO 7110.65, Vectors for Visual Approach, Para 7-4-2.

c. Nonapproach control towers may be authorized to provide visual separation between aircraft within surface areas or designated areas provided other separation is assured before and after the application of visual separation. This may be applied by the nonapproach control tower providing the separation or by a pilot visually observing another aircraft and being instructed to maintain visual separation with that aircraft.

PHRASEOLOGY-
VISUAL SEPARATION APPROVED BETWEEN (identification) AND (identification),

and for departing aircraft,

(departing/succeeding aircraft) RELEASED YOUR DISCRETION.

NOTE-
Separation of IFR aircraft before and after application of visual separation is an IFR control function (Approach/Departure/En Route). A nonapproach control tower by accepting authorization for visual separation becomes responsible for ensuring that separation. Separation requirements also apply to VFR aircraft when IFR, Class B, Class C or TRSA separation is prescribed.

REFERENCE-
FAAO 7110.65, Practice Approaches, Para 4-8-11.
FAAO 7110.65, Application, Para 5-6-1.
FAAO 7110.65, Vectors for Visual Approach, Para 7-4-2.
FAAO 7110.65, Application, Para 7-6-1.
FAAO 7110.65, Application, Para 7-7-1.
FAAO 7110.65, Issuance of EFC, Para 7-7-2.
FAAO 7110.65, Separation, Para 7-7-3.
FAAO 7110.65, Helicopter Traffic, Para 7-7-4.
FAAO 7110.65, Altitude Assignments, Para 7-7-5.
FAAO 7110.65, Approach Interval, Para 7-7-6.
FAAO 7110.65, TRSA Departure Information, Para 7-7-7.
FAAO 7110.65, Class C Services, Para 7-8-2.
FAAO 7110.65, Separation, Para 7-8-3.
FAAO 7110.65, Establishing Two-Way Communications, Para 7-8-4.
FAAO 7110.65, Altitude Assignments, Para 7-8-5.
FAAO 7110.65, Exceptions, Para 7-8-6.
FAAO 7110.65, Application, Para 7-9-1.
FAAO 7110.65, Methods, Para 7-9-3.
FAAO 7110.65, Separation, Para 7-9-4.
FAAO 7110.65, Helicopter Traffic, Para 7-9-6.
FAAO 7110.65, Altitude Assignments, Para 7-9-7.

Section 4. Approaches

7-4-1. VISUAL APPROACH

A visual approach is an ATC authorization for an aircraft on an IFR flight plan to proceed visually to the airport of intended landing; it is not an instrument approach procedure. Also, there is no missed approach segment. An aircraft unable to complete a visual approach shall be handled as any go-around and appropriate separation must be provided.

REFERENCE-
FAAO 7110.65, Wake Turbulence Cautionary Advisories, Para 2-1-20.
FAAO 7110.65, Forwarding Approach Information by Nonapproach Control Facilities, Para 3-10-2.
FAAO 7110.65, Visual Separation, Para 7-2-1.
FAAO 7110.65, Approaches to Multiple Runways, Para 7-4-4.

7-4-2. VECTORS FOR VISUAL APPROACH

A vector for a visual approach may be initiated if the reported ceiling at the airport of intended landing is at least 500 feet above the MVA/MIA and the visibility is 3 miles or greater. At airports without weather reporting service there must be reasonable assurance (e.g. area weather reports, PIREP's, etc.) that descent and flight to the airport can be made visually, and the pilot must be informed that weather information is not available.

PHRASEOLOGY-
(Ident) FLY HEADING OR TURN RIGHT/LEFT HEADING (degrees) VECTOR FOR VISUAL APPROACH TO (airport name).

(If appropriate)

WEATHER NOT AVAILABLE.

NOTE-
At airports where weather information is not available, a pilot request for a visual approach indicates that descent and flight to the airport can be made visually and clear of clouds.

REFERENCE-
FAAO 7110.65, Vectors to Final Approach Course, Para 5-9-1.
FAAO 7110.65, Visual Separation, Para 7-2-1.
FAAO 7110.65, Clearance for Visual Approach, Para 7-4-3.
FAAO 7110.65, Approaches to Multiple Runways, Para 7-4-4.
FAAO 7110.65, Sequencing, Para 7-6-7.
FAAO 7110.65, Separation, Para 7-7-3.

7-4-3. CLEARANCE FOR VISUAL APPROACH

ARTCC's and approach controls may clear aircraft for visual approaches using the following procedures:

NOTE-
Towers may exercise this authority when authorized by a LOA with the facility that provides the IFR service, or by a facility directive at collocated facilities.

a. Controllers may initiate, or pilots may request, a visual approach even when an aircraft is being vectored for an instrument approach and the pilot subsequently reports:

1. The airport or the runway in sight at airports with operating control towers.

2. The airport in sight at airports without a control tower.

b. Resolve potential conflicts with all other aircraft, advise an overtaking aircraft of the distance to the preceding aircraft and speed difference, and ensure that weather conditions at the airport are VFR or that the pilot has been informed that weather is not available for the destination airport. Upon pilot request, advise the pilot of the frequency to receive weather information where AWOS/ASOS is available.

PHRASEOLOGY-
(Ident) (instructions) CLEARED VISUAL APPROACH RUNWAY (number);

or

(ident) (instructions) CLEARED VISUAL APPROACH TO (airport name)

(and if appropriate)

WEATHER NOT AVAILABLE OR VERIFY THAT YOU HAVE THE (airport) WEATHER.

REFERENCE-
FAAO 7110.65, Visual Separation, Para 7-2-1.

c. Clear an aircraft for a visual approach when:

1. The aircraft is number one in the approach sequence, or

2. The aircraft is to follow a preceding aircraft and the pilot reports the preceding aircraft in sight and is instructed to follow it, or

NOTE-
The pilot need not report the airport/runway in sight.

3. The pilot reports the airport or runway in sight but not the preceding aircraft. Radar separation must be maintained until visual separation is provided.

d. All aircraft following a heavy jet/B757 must be informed of the airplane manufacturer and model.

EXAMPLE-
"Cessna Three Four Juliet, following a Boeing 757, 12 o'clock, six miles."

e. Inform the tower of the aircraft's position prior to communications transfer at controlled airports. ARTS/STARS functions may be used provided a facility directive or LOA specifies control and communication transfer points.

PHRASEOLOGY-
(Ident) (instructions) CLEARED VISUAL APPROACH RUNWAY (number);

or

(ident) (instructions) CLEARED VISUAL APPROACH TO (airport name).

(And if appropriate)

WEATHER NOT AVAILABLE OR AWOS/ASOS WEATHER AVAILABLE ON FREQUENCY (freq) MHZ.

f. In addition to the requirements of para 7-4-2, Vectors for Visual Approach, and subparas a, b, c, d, and e, ensure that the location of the destination airport is provided when the pilot is asked to report the destination airport in sight.

g. In those instances where airports are located in close proximity, also provide the location of the airport that may cause the confusion.

EXAMPLE-
"Cessna Five Six November, Cleveland Burke Lakefront Airport is at 12 o'clock, 5 miles. Cleveland Hopkins Airport is at 1 o'clock 12 miles. Report Cleveland Hopkins in sight."

REFERENCE-
FAAO 7110.65, Approaches to Multiple Runways, Para 7-4-4.

7-4-4. APPROACHES TO MULTIPLE RUNWAYS

a. All aircraft must be informed that approaches are being conducted to parallel/intersecting/converging runways. This may be accomplished through use of the ATIS.

b. When conducting visual approaches to multiple runways ensure the following:

1. Do not permit the respective aircrafts' primary radar returns to merge unless visual separation is being applied.

2. When the aircraft flight paths intersect, ensure standard separation is maintained until visual separation is provided.

c. In addition to the requirements in para 7-2-1, Visual Separation, para 7-4-1, Visual Approach, para 7-4-2, Vectors for Visual Approach, and para 7-4-3, Clearance for Visual Approach, the following conditions apply to visual approaches being conducted simultaneously to parallel, intersecting, and converging runways, as appropriate:

1. Parallel runways separated by less than 2,500 feet. Unless standard separation is provided by ATC, an aircraft must report sighting a preceding aircraft making an approach (instrument or visual) to the adjacent parallel runway. When an aircraft reports another aircraft in sight on the adjacent final approach course and visual separation is applied, controllers must advise the succeeding aircraft to maintain visual separation. However, do not permit a heavy/B757 aircraft to overtake another aircraft. Do not permit a large aircraft to overtake a small aircraft.

2. Parallel runways separated by at least 2,500 feet, but less than 4,300 feet.

(a) Standard separation is provided until the aircraft are established on a heading which will intercept the extended centerline of the runway at an angle not greater than 30 degrees, and each aircraft has been issued and the pilot has acknowledged receipt of the visual approach clearance.

NOTE-
The intent of the 30 degree intercept angle is to reduce the potential for overshoots of the final, and preclude side-by-side operations with one or both aircraft in a "belly-up" configuration during the turn. Aircraft performance, speed, and the number of degrees of the turn to the final are factors to be considered by the controller when vectoring aircraft to parallel runways.

(b) Visual approaches may be conducted to one runway while visual or instrument approaches are conducted simultaneously to the other runway, provided the conditions of subpara (a) are met.

(c) Provided aircraft flight paths do not intersect, and when the provisions of subparas (a) and (b) are met, it is not necessary to apply any other type of separation with aircraft on the adjacent final approach course.

Section 9. Class B Service Area- Terminal

7-9-1. APPLICATION

Apply Class B services and procedures within the designated Class B airspace.

a. No person may operate an aircraft within Class B airspace unless:

1. The aircraft has an operable two-way radio capable of communications with ATC on appropriate frequencies for that Class B airspace.

2. The aircraft is equipped with the applicable operating transponder and automatic altitude reporting equipment specified in para (a) of 14 CFR Section 91.215, except as provided in para (d) of that section.

7-9-2. VFR AIRCRAFT IN CLASS B AIRSPACE

a. VFR aircraft must obtain an ATC clearance to operate in Class B airspace.

REFERENCE-
FAAO 7110.65, Operational Requests, Para 2-1-18.
FAAO 7110.65, Airspace Classes, Para 2-4-22.

PHRASEOLOGY-
CLEARED THROUGH/TO ENTER/OUT OF BRAVO AIRSPACE,

and as appropriate,

VIA (route). MAINTAIN (altitude) WHILE IN BRAVO AIRSPACE.

or

CLEARED AS REQUESTED.

(Additional instructions, as necessary.)

REMAIN OUTSIDE BRAVO AIRSPACE. (When necessary, reason and/or additional instructions.)

NOTE-
1. *Assignment of radar headings, routes, or altitudes is based on the provision that a pilot operating in accordance with VFR is expected to advise ATC if compliance will cause violation of any part of the CFR.*

2. *Separation and sequencing for VFR aircraft is dependent upon radar. Efforts should be made to segregate VFR traffic from IFR traffic flows when a radar outage occurs.*

b. Approve/deny requests from VFR aircraft to operate in Class B airspace based on workload, operational limitations and traffic conditions.

c. Inform the pilot when to expect further clearance when VFR aircraft are held either inside or outside Class B airspace.

d. Inform VFR aircraft when leaving Class B airspace.

PHRASEOLOGY-
LEAVING (name) BRAVO AIRSPACE,

and as appropriate,

RESUME OWN NAVIGATION, REMAIN THIS FREQUENCY FOR TRAFFIC ADVISORIES, RADAR SERVICE TERMINATED, SQUAWK ONE TWO ZERO ZERO.

7-9-3. METHODS

a. To the extent practical, clear large turbine engine-powered airplanes to/from the primary airport using altitudes and routes that avoid VFR corridors and airspace below the Class B airspace floor where VFR aircraft are operating.

NOTE-
Pilots operating in accordance with VFR are expected to advise ATC if compliance with assigned altitudes, headings, or routes will cause violation of any part of the CFR.

b. Vector aircraft to remain in Class B airspace after entry. Inform the aircraft when leaving and reentering Class B airspace if it becomes necessary to extend the flight path outside Class B airspace for spacing.

NOTE-
14 CFR Section 91.131 states that "Unless otherwise authorized by ATC, each person operating a large turbine engine-powered airplane to or from a primary airport for which a Class B airspace area is designated must operate at or above the designated floors of the Class B airspace area while within the lateral limits of that area." Such authorization should be the exception rather than the rule.

REFERENCE-
FAAO 7110.65, Deviation Advisories, Para 5-1-10.

c. Aircraft departing controlled airports within Class B airspace will be provided the same services as those aircraft departing the primary airport.

REFERENCE-
FAAO 7110.65, Operational Requests, Para 2-1-18.

7-9-4. SEPARATION

a. Standard IFR services to IFR aircraft.

b. VFR aircraft shall be separated from VFR/IFR aircraft that weigh more than 19,000 pounds and turbojets by no less than:

NOTE-
Aircraft weighing 19,000 pounds or less include all of the aircraft in SRS categories I and II plus SC7, G73, E110, DO82, STAR, S601, BE30, B350, SW3, B190, and C212.

1. 1 $^1/_2$ miles separation, or

2. 500 feet vertical separation, or

NOTE-
Apply the provisions of para 5-5-3, Minima, when wake turbulence separation is required.

3. Visual separation, as specified in para 7-2-1, Visual Separation, para 7-4-2, Vectors for Visual Approach, and para 7-6-7, Sequencing.

NOTE-
Issue wake turbulence cautionary advisories in accordance with para 2-1-20, Wake Turbulence Cautionary Advisories.

c. VFR aircraft shall be separated from all VFR/IFR aircraft which weigh 19,000 pounds or less by a minimum of:

1. Target resolution, or

2. 500 feet vertical separation, or

NOTE-
Apply the provisions of para 5-5-3, Minima, when wake turbulence separation is required.

3. Visual separation, as specified in para 7-2-1, Visual Separation, para 7-4-2, Vectors for Visual Approach, and para 7-6-7, Sequencing.

NOTE-
Issue wake turbulence cautionary advisories in accordance with para 2-1-20, Wake Turbulence Cautionary Advisories.

REFERENCE-
P/CG Term- Lateral Separation.
P/CG Term- Radar Separation.
P/CG Term- Target Resolution.
P/CG Term- Visual Separation.

7-9-5. TRAFFIC ADVISORIES

a. Provide mandatory traffic advisories and safety alerts, between all aircraft.

b. Apply merging target procedures in accordance with para 5-1-8, Merging Target Procedures.

7-9-6. HELICOPTER TRAFFIC

VFR helicopters need not be separated from VFR or IFR helicopters. Traffic advisories and safety alerts shall be issued as appropriate.

7-9-7. ALTITUDE ASSIGNMENTS

a. Altitude information contained in a clearance, instruction, or advisory to VFR aircraft shall meet MVA, MSA, or minimum IFR altitude criteria.

b. Issue altitude assignments, if required, consistent with the provisions of 14 CFR Section 91.119.

NOTE-
The MSA's are:
1. Over congested areas, an altitude at least 1,000 feet above the highest obstacle,
2. Over other than congested areas, an altitude at least 500 feet above the surface.

REFERENCE-
FAAO 7110.65, Flight Direction, Para 4-5-2.
FAAO 7110.65, Exceptions, Para 4-5-3.
FAAO 7110.65, Minimum En Route Altitudes, Para 4-5-6.

c. Aircraft assigned altitudes which are contrary to 14 CFR Section 91.159 shall be advised to resume altitudes appropriate for the direction of flight when the altitude assignment is no longer required or when leaving Class B airspace.

PHRASEOLOGY-
RESUME APPROPRIATE VFR ALTITUDES.

7-9-8. APPROACH INTERVAL

The tower shall specify the approach interval.

Section 5. Offshore/Oceanic Transition Procedures

8-5-1. ALTITUDE/FLIGHT LEVEL TRANSITION

When vertical separation is applied between aircraft crossing the offshore / oceanic airspace boundary below FL 180, control action shall be taken to ensure that differences between the standard altimeter setting (QNE) and local altimeter setting (QNH) do not compromise separation. (See FIG 8-5-1.)

Standard and Local Altimeter Setting Differences

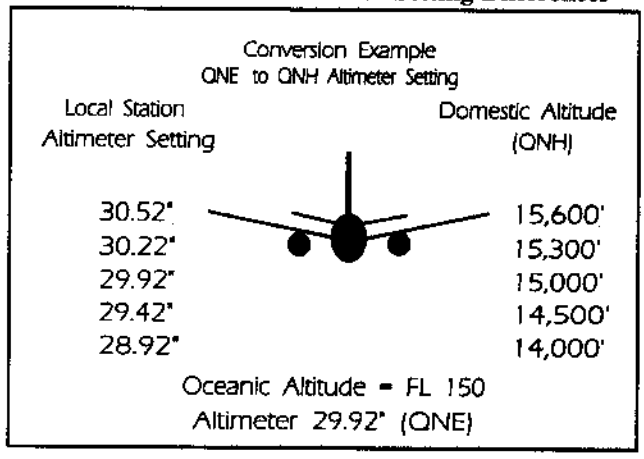


FIG 8-5-1

8-5-2. COURSE DIVERGENCE

When aircraft are entering oceanic airspace, separation will exist in oceanic airspace when:

a. Domestic lateral separation exists at the oceanic control boundary;

b. Courses diverge by at least 15° until the oceanic lateral separation is established.

8-5-3. OPPOSITE DIRECTION

When transitioning from an offshore airspace area to oceanic airspace, an aircraft may climb through opposite direction oceanic traffic provided vertical separation above that traffic is established:

a. Before the outbound crosses the offshore/oceanic boundary; and

b. 15 minutes before the aircraft are estimated to pass. (See FIG 8-5-2.)

Transitioning From Offshore to Oceanic Airspace Opposite Direction

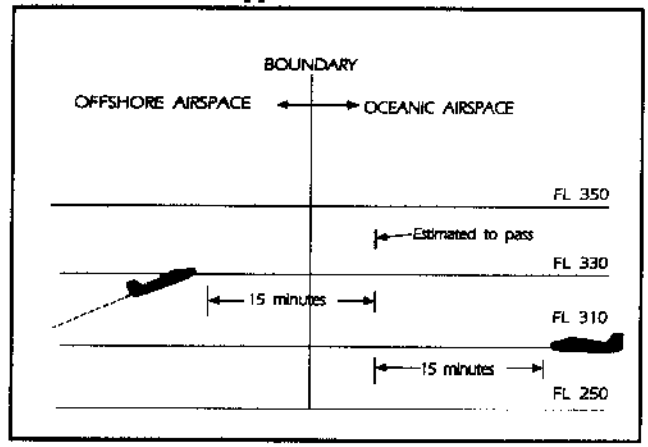


FIG 8-5-2

8-5-4. SAME DIRECTION

When transitioning from an offshore airspace area to oceanic airspace or while within oceanic airspace, apply 5 minutes minimum separation when a following aircraft on the same course is climbing through the altitude of the preceding aircraft if the following conditions are met:

a. The preceding aircraft is level at the assigned altitude and is maintaining a speed equal to or greater than the following aircraft; and

b. The minimum of *5 minutes* is maintained between the preceding and following aircraft; and

c. The following aircraft is separated by not more than 4,000 feet from the preceding aircraft when the climb clearance is issued; and

d. The following aircraft commences climb within *10 minutes* after passing:

1. An exact reporting point (DME fix or intersection formed from NAVAID's) which the preceding aircraft has reported; or

2. A radar observed position over which the preceding aircraft has been observed; and

e. The following aircraft is in direct communication with air traffic control until vertical separation is established. (See FIG 8-5-3.)

Transitioning From Offshore to Oceanic Airspace Same Direction

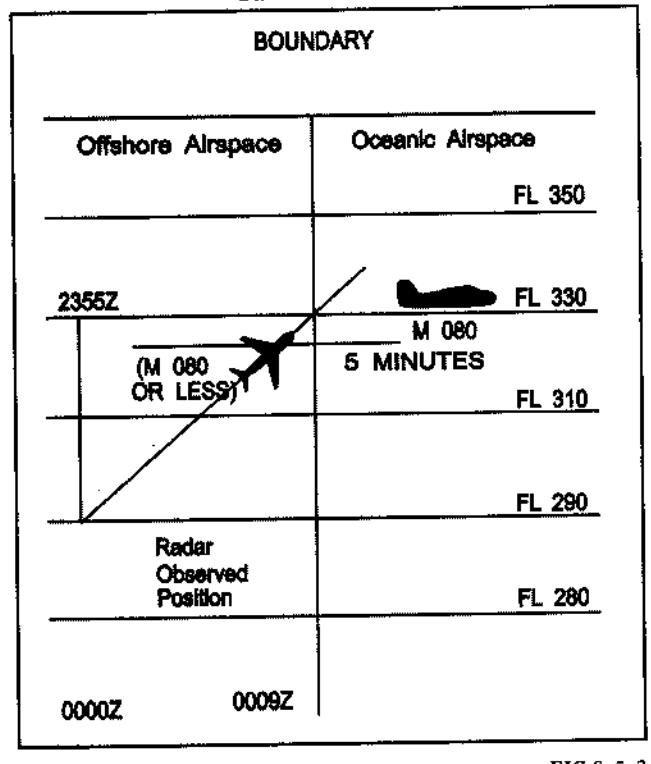


FIG 8-5-3

Section 3. Special Operations

9-3-1. AIRCRAFT CARRYING DANGEROUS MATERIALS

a. Provide the following special handling to military aircraft or military contracted aircraft carrying dangerous materials when:

1. The words "dangerous cargo," or "inert devices," or both are contained in the remarks section of the filed flight plan, or

NOTE-
1. Certain types of military flights carrying dangerous materials require strict adherence to military regulations and flight planning along carefully selected routes. These flights must avoid heavily populated areas.

2. "Inert devices" are devices containing no dangerous materials but closely resembling nuclear or explosive items that are classified as dangerous and could be easily mistaken for their dangerous counterparts.

2. The pilot uses these words in radio communication.

b. If it becomes necessary to issue a clearance to amend the route/altitude, advise the pilot:

1. Of the proposed change, and

2. The amount of delay to expect if it is necessary to maintain the present route/altitude.

c. When it becomes necessary for the pilot to refuse a clearance amending his/her route/altitude, he/she will advise if the traffic delay is acceptable or if an alternate route/altitude is desired. In such cases, offer all possible assistance.

d. When the aircraft is provided an en route descent, do not vector the aircraft from the planned route unless the pilot concurs.

e. Use special patterns and routings in areas where they have been developed for these flights. If special patterns and routings have not been developed, employ normal procedures.

9-3-2. CELESTIAL NAVIGATION TRAINING

EN ROUTE

a. Approve flight plans specifying celestial navigation only when it is requested for USAF or USN aircraft.

NOTE-
An ATC clearance must be obtained by the pilot before discontinuing conventional navigation to begin celestial navigation training. The pilot will advise when discontinuing celestial navigation and resuming conventional navigation. Celestial navigation training will be conducted within 30 NM of the route centerline specified in the en route clearance unless otherwise authorized by ATC. During celestial navigation training, the pilot will advise ATC before initiating any heading changes which exceed 20 degrees.

b. Within conterminous U.S. airspace, limit celestial navigation training to transponder-equipped aircraft within areas of ARTCC radar coverage.

c. Prior to control transfer, ensure that the receiving controller is informed of the nature of the celestial navigation training leg.

REFERENCE-
FAAO 7110.65, IFR Flight Progress Data, Para 2-2-6.

9-3-3. DEPARTMENT OF ENERGY (DOE) SPECIAL FLIGHTS

a. Provide notification of possible route or altitude changes as far in advance as possible for "RAC" flights. The pilot will indicate if the proposed change is acceptable or if alternate routing or altitude will be requested.

NOTE-
DOE contracts for civil pilots to operate public aircraft to transport radioactive or high explosive materials within the conterminous U.S. These flights operate on an IFR flight plan but principally during daylight hours and VFR conditions. These flights require flight along carefully selected routes and, in some instances, pilots will refuse clearances that require reroute or altitude changes that would derogate their objective.

b. *EN ROUTE.* Approve pilot requests to leave center frequency for operational purposes as traffic conditions permit.

c. Notify a supervisor in the event any of the following occurs with "RAC" aircraft:

1. Loss of radio contact.

2. Loss of radar contact.

3. The flight is overdue at the destination.

d. If you receive information that a "RAC" aircraft is involved in an accident, secure as much information as possible, particularly with respect to location, and immediately notify the ARTCC supervisory traffic management coordinator-in-charge.

NOTE-
There is a possibility of an explosive or radiation hazard of an "RAC" aircraft involved in an accident.

9-3-4. EXPERIMENTAL AIRCRAFT OPERATIONS

a. When notified that an experimental aircraft requires special handling:

NOTE-
14 CFR Section 91.319(d)(3) requires that each person operating an aircraft with an experimental certificate shall notify the control tower of the experimental nature of the aircraft when operating into or out of airports with operating control towers.

1. Clear the aircraft according to pilot requests as traffic permits and if not contrary to ATC procedures.

2. Once approved, do not ask the pilot to deviate from a planned action except to preclude an emergency situation.

b. At locations where volume or complexity of experimental aircraft operations warrant, a letter of agreement may be consummated between the facility and operator.

9-3-5. FAA RESEARCH AND DEVELOPMENT FLIGHTS

When coordinated in advance and traffic permits, approve requests for special flight procedures from aircraft participating in FAA research and development test activities. These special procedures shall be applied to participating aircraft/vehicles.

NOTE-
Special flight procedures for FAA research and development test activities must be approved by the facility air traffic manager prior to their use.

REFERENCE-
FAAO 7210.3, Research and Development Flights, Para 5-2-4.

9-3-6. FLYNET

Provide expeditious handling for civil or military aircraft using the code name "FLYNET." Relay the code name as an element in the remarks position of the flight plan.

NOTE-
The code name "FLYNET" indicates that an aircraft is transporting a nuclear emergency team or a disaster control team to the location of a nuclear accident or a major accident involving chemical agents or biological research materials. It is in the public interest that they reach their destination as rapidly as possible.

REFERENCE-
FAAO 7110.65, Operational Priority, Para 2-1-4.
FAAO 7610.4, "FLYNET" Flights, Nuclear Emergency Teams, Para 12-4-1. ■

9-3-7. IFR MILITARY TRAINING ROUTES

a. Except for aircraft operating in the same altitude reservation, clear aircraft into an MTR provided separation will be applied between successive aircraft unless otherwise covered in a letter of agreement between the military scheduling activity and the concerned ATC facility.

PHRASEOLOGY-
CLEARED INTO IR (designator).
MAINTAIN (altitude),

or

MAINTAIN IR (designator) ALTITUDE(S),

or

MAINTAIN AT OR BELOW (altitude),

or

CRUISE (altitude),

and if required,

CROSS (fix) AT OR LATER THAN (time).

b. Unless otherwise covered in a letter of agreement between the military scheduling activity and the concerned FAA facility, clear aircraft to exit an MTR.

PHRASEOLOGY-
CLEARED TO (destination/clearance limit) FROM IR (designator/exit fix) VIA (route).
MAINTAIN (altitude).

c. If the provisions of subpara a above cannot be accomplished, MTR's may be designated for MARSA operations. To preclude an inadvertent compromise of MARSA standards by ATC, appropriate MARSA application for such routes shall be covered in a letter of agreement with the military scheduling activity. Establish separation between aircraft as soon as practicable after operation on the designated MARSA route is ended.

NOTE-
For designated MARSA routes, the military assumes responsibility for separation for MTR aircraft that have passed the primary/alternate entry fix until separation is established by ATC after operations on the MARSA route are completed.

NOTE-
1. During aerial refueling, tanker aircraft are responsible for receiver aircraft communication with ATC and for their navigation along the track.

2. Aerial refueling airspace is not sterilized airspace and other aircraft may transit this airspace provided vertical or lateral separation is provided from refueling aircraft.

3. MARSA begins between the tanker and receiver when the tanker and receiver(s) have entered the air refueling airspace and the tanker advises ATC that he/she is accepting MARSA.

4. MARSA ends between the tanker and receiver when the tanker advises ATC that the tanker and receiver aircraft are vertically positioned within the air refueling airspace and ATC advises MARSA is terminated.

REFERENCE-
FAAO 7110.65, Use of MARSA, Para 2-1-11.
FAAO 7110.65, Additional Separation for Formation Flights, Para 5-5-8.
FAAO 7610.4, Chapter 10, Aerial Refueling.

a. Provide radar assistance to the rendezvous for participating aircraft:

1. When requested, and

2. By providing vertical separation prior to MARSA declaration.

b. Do not request receiver aircraft that have been cleared to conduct air refueling and have departed the ARIP to:

1. Make code changes when less than 5 miles from the tanker.

2. Squawk standby when less than 1 mile or more than 3 miles from the tanker.

NOTE-
Requests for receiver aircraft to make code changes during air refueling diverts the receiver pilot's attention during a critical phase of flight.

c. When issuing an initial air refueling clearance, you may request a receiver to squawk standby when the receiver reaches a point 3 miles from the tanker.

NOTE-
1. Receiver aircraft will squawk normal when separation from the tanker is greater than 3 miles.

2. Once rendezvous is completed, heading and altitude assignments may be made with the tanker concurrence with MARSA remaining in effect.

3. Upon rendezvous completion, the tanker shall keep receiver aircraft within 3 miles of the tanker until MARSA is terminated.

d. After MARSA has been declared, you should avoid issuing course or altitude changes prior to rendezvous.

NOTE-
Altitude or course changes issued will automatically void MARSA.

e. Do not use the altitude vacated during the refueling operation until the refueling aircraft has reported reaching the next IFR altitude.

REFERENCE-
FAAO 7110.65, Exceptions, Para 6-6-2.

f. Approve requests by the tanker pilot for vectors or alternative routes or altitudes as follows:

1. Furnish vectors or alternative altitudes at any time.

2. Furnish nonradar routes only after the refueling aircraft have passed the ARCP.

NOTE-
1. To meet a training requirement that aerial refueling be accomplished in a nonradar environment, the military has requested that vectors be furnished only upon request.

2. The tanker commander is responsible for coordinating all inflight requests with other aircraft in the refueling mission before submission of such requests to the center.

3. Normally, aircraft conducting aerial refueling operations will utilize at least three consecutive altitudes.

g. Unless a vector or alternative route has been furnished, clear the aircraft to depart the refueling track at a navigational reference point or egress fix.

h. Request an aircraft to report the ARIP, ARCP, or egress fix as necessary.

PHRASEOLOGY-
REPORT:

A-R-I-P,

or

A-R-C-P,

or

EGRESS FIX.

i. Expect the following procedures in addition to those required by the appropriate parts of Title 14 of the Code of Federal Regulations in the event of two-way communications failure:

1. The tanker will depart the track from the highest altitude in the block.

2. The receiver will depart the track from the lowest altitude in the block.

3. Aircraft will squawk 7600 for at least 2 minutes prior to departing the track.

REFERENCE-
FAAO 7110.65, Military Operations Above FL 600, Para 9-3-11.

9-3-11. MILITARY OPERATIONS ABOVE FL 600

Control aircraft operating above FL 600 using the following procedures:

a. Flight plans involving supersonic flight are required 16 hours in advance of proposed departure times for processing and approval by the ARTCC's concerned. The originating ARTCC, where the flight plan is first filed, may waive the 16 hour advance filing requirement.

b. The route of flight shall be defined by at least one high altitude fix within each ARTCC area without regard to the distance between fixes. Additionally, the entry and exit points of turns of 90 degrees or more will be designated.

c. Elapsed times from takeoff to the first fix in each ARTCC area shall be included in the route of flight.

d. The ARTCC which originates the flight plan shall forward departure times to all ARTCC's responsible for processing the flight plan.

e. Approval of the flight plan indicates approval of both route and FL's (if stated) including operations below FL 600 (aerial refueling).

PHRASEOLOGY-
CLEARED AS FILED VIA ROUTE AND FLIGHT LEVELS.

REFERENCE-
FAAO 7110.65, Military Aerial Refueling, Para 9-3-10.

f. Separation. Use the following as minima in lieu of the corresponding type of separation prescribed in:

NOTE-
The primary method described to provide separation between two supersonic aircraft is to descend the aircraft at the lower FL and provide vertical separation since the aircraft at the higher FL may not be able to climb rapidly enough to establish the required separation. Another aspect which should be considered is that supersonic aircraft during turns, either programmed or as the result of vectors, will lose a few thousand feet. Vectoring supersonic aircraft seriously affects the range and mission objectives. Radar separation is the preferred method of separating a subsonic aircraft both from another subsonic aircraft or from a supersonic aircraft.

1. Para 4-5-1, Vertical Separation Minima: *5,000 feet.*

NOTE-
1. *The security requirements of the military services preclude the transmission of actual altitude information on the air/ground or landline circuits. A classified document detailing the plan for ascertaining altitude codes for the day should be readily available to the controllers at their positions of operation.*

2. *Pilots will report their altitude, using the coded plan, and intended flight profile on initial contact with each ARTCC.*

2. Para 6-5-4, Minima Along Other Than Established Airways or Routes: Protect the airspace 25 miles either side of the route centerline. For turns by supersonic aircraft, protect the airspace 75 miles on the overflown side and 25 miles on the other side. For turns by subsonic aircraft, protect the airspace 34 miles on the overflown side and 25 miles on the other side.

REFERENCE-
FAAO 7110.65, Abbreviated Departure Clearance, Para 4-3-3.

Section 4. Special Use and ATC Assigned Airspace

9-4-1. APPLICATION

Apply the procedures in this section to aircraft operating in proximity to special use or ATC assigned airspace (ATCAA) unless the airspace is designated an Alert Area/Controlled Firing Area or one of the following conditions exist:

NOTE-
These procedures are not applicable to Alert Areas or Controlled Firing Areas.

REFERENCE-
P/CG Term- Special Use Airspace.

a. The pilot informs you that permission has been obtained from the using agency to operate in the airspace.

b. The using agency informs you they have given permission for the aircraft to operate in the airspace.

NOTE-
Using agency permission may be relayed to the pilot.

c. The Restricted/Warning Area, MOA, or ATCAA has been released to the controlling agency.

d. The aircraft is on an approved ALTRV, unless the airspace area in question is an ATCAA.

NOTE-
Mission project officers are responsible for obtaining approval for ALTRV operations within Prohibited/Restricted/Warning Areas and MOA's.

REFERENCE-
FAAO 7110.65, Transiting Active SUA/ATCAA, Para 9-4-4.

e. Operations in special use airspace located in offshore/oceanic airspace will be conducted in accordance with the procedures in Chapter 8, Offshore/Oceanic Procedures.

9-4-2. SEPARATION MINIMA

Unless clearance of nonparticipating aircraft in/through/adjacent to a Prohibited/Restricted/Warning Area/MOA/ATCAA is provided for in a Letter of Agreement (LOA) or Letter of Procedure (LOP), separate nonparticipating aircraft from active special use airspace by the following minima:

a. Assign an altitude consistent with para 4-5-2, Flight Direction, and 4-5-3, Exceptions, which is at least 500 feet (above FL 290-1000 feet) above/below the upper/lower limit of the Prohibited/Restricted/Warning Area/MOA/ATCAA.

REFERENCE-
FAAO 7210.3, Prohibited/Restricted Areas, Para 2-1-16.

b. Provide radar separation of 3 miles (En route Stage A/DARC, FL 600 and above - 6 miles) from the special use airspace peripheral boundary.

c. Clear aircraft on airways or routes whose widths or protected airspace do not overlap the peripheral boundary.

d. Exception. Some Prohibited/Restricted/Warning Areas are established for security reasons or to contain hazardous activities not involving aircraft operations. Where facility management has identified these areas as outlined in FAAO 7210.3, Facility Operation and Administration, vector aircraft to remain clear of the peripheral boundary.

NOTE-
Nonparticipating aircraft refers to those aircraft for which you have separation responsibility and which have not been authorized by the using agency to operate in/through the special use airspace or ATCAA in question.

9-4-3. VFR-ON-TOP

If the aircraft's route, track, or altitude may cause it to enter an active Prohibited/Restricted/Warning Area, MOA, or ATCAA:

a. Inform the pilot to conduct flight "VFR-on-top" at least 500 feet above the upper limit or lower limit of the airspace (subject to para 7-3-1, VFR-on-top); or

PHRASEOLOGY-
MAINTAIN VFR-ON-TOP AT LEAST 500 FEET ABOVE/BELOW (upper/lower limit of airspace) ACROSS (name or number of airspace) BETWEEN (fix) AND (fix);

and if the airspace is an ATCAA,

(name of ATCAA) IS ATC ASSIGNED AIRSPACE.

REFERENCE-
FAAO 7110.65, Class A Airspace Restrictions, Para 7-1-1.

b. Clear the aircraft via a routing which provides approved separation from the airspace.

c. *Exception:* Some Prohibited/Restricted Areas are established for security reasons or to contain hazardous activities not involving aircraft operations. The addition of 500 (or 1,000) feet to the upper/lower limit of these Prohibited/Restricted Areas is not required if the areas have been identified by facility management.

REFERENCE-
FAAO 7210.3, Prohibited/Restricted Areas, Para 2-1-16.

9-4-4. TRANSITING ACTIVE SUA/ATCAA

If a LOA/LOP has been coordinated with the Using Agency and permission has been granted to transit the area:

a. Comply with the instruction/clearances issued by the Using Agency and provide the applicable separation minima between aircraft when two or more aircraft are transiting the area; or

NOTE-
Some Using Agencies are also air traffic control facilities.

b. If unable to comply with instructions/clearances, clear the aircraft in accordance with para 9-4-2, Separation Minima.

NOTE-
The FAA has no jurisdictional authority over the use of nonjoint use prohibited/restricted/warning area airspace; therefore, clearance cannot be issued for flight therein without the appropriate approval.

Section 7. Unmanned Free Balloons

9-7-1. APPLICATION

Shapes of 11 Million Cubic Feet Balloon at Various Altitudes

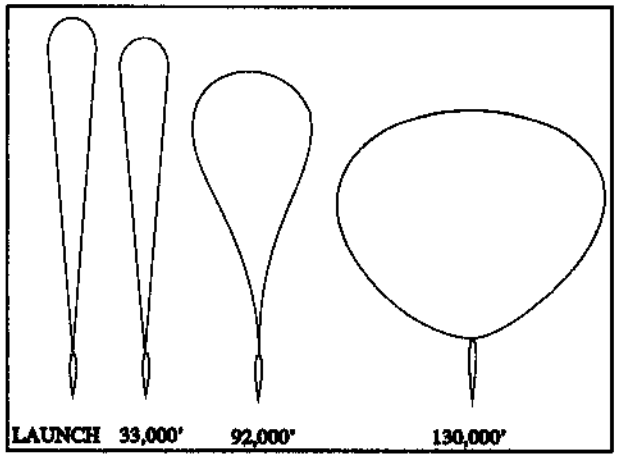


FIG 9-7-1

Apply the following procedures, as appropriate, when unmanned free balloons are within airspace for which you have control jurisdiction:

NOTE-
These procedures apply to unmanned free balloons that carry payloads as described in 14 CFR Section 101.1(a)(4). Payloads may weigh several hundred pounds and the physical shape of the balloons change at various altitudes/flight levels. (See FIG 9-7-1.) Balloon and payload ascend at an average rate of 400 feet a minute. Over the descent area, the payload is normally released from the balloon and descends by parachute at a minimum rate of 1,000 feet a minute. The balloon is normally deflated automatically when the payload is released. The operator is required to advise ATC 1 hour in advance of descent in accordance with 14 CFR Section 101.39.

a. Post the balloon flight on flight progress strips along the planned trajectory and revise routing as tracking/position reports require.

NOTE-
The prelaunch notice information should be posted on flight progress strips for planning and operational purposes.

b. Radar flight follow balloons to the extent that equipment capabilities permit. If radar flight following is not possible, tracking should be attempted by communication with the "chase plane," telephone contact with the operator, pilot, or ground observation reports.

NOTE-
Some operators have equipped their balloons with transponder beacons in addition to a radar reflection device or material required by 14 CFR Section 101.35, but at cruise altitude, the balloon's communications equipment and transponder, if so equipped, are operated intermittently to conserve battery energy.

c. With pilot concurrence, provide separation between aircraft and balloons when you are satisfied that the balloon information is sufficiently reliable to provide the service. Do not attempt to separate aircraft from the balloon by using vertical separation unless you have accurate balloon altitude information.

d. Provide traffic advisories to all affected aircraft during initial contact specifying the balloon's known or estimated position, direction of movement, and altitude as "unknown" or "reported," as appropriate.

NOTE-
Unless ATC requires otherwise, operators of unmanned free balloons are required to monitor the course of the balloon and record its position at least every two hours. As required in 14 CFR Section 101.39a, balloon position reports are not forwarded by the operator unless requested by ATC.

PHRASEOLOGY-
UNMANNED FREE BALLOON OVER (name of location),

or

ESTIMATED OVER (name of location), MOVING (direction of movement).

LAST REPORTED ALTITUDE AT (altitude as reported by the operator or determined from pilot report),

or

ALTITUDE UNKNOWN.

e. To transfer flight following responsibility of balloons between facilities or between controllers, forward the following information when available:

REFERENCE-
14 CFR Section 101.37, Notice Requirements.
14 CFR Section 101.39, Balloon Position Reports.

1. Identification and type; e.g., Flight 804 Balloon.

2. Last known position and altitude.

3. General direction of movement and speed.

4. ETA over facility boundary, sector boundary, or other point if believed to be reasonably accurate.

5. Other pertinent information.

6. If in radar contact, physically point out the target to the receiving controller.

7. The name and the telephone number of the location where tracking is being accomplished.

REFERENCE-
FAAO 7110.65, Derelict Balloons, Para 9-7-2.

9-7-2. DERELICT BALLOONS

Balloons become derelict when a moored balloon slips its mooring and becomes a hazard to air navigation or when an unmanned free balloon flight cannot be terminated as planned. When this occurs:

a. In the case of a moored balloon which has slipped its moorings, issue traffic advisories.

b. In the case of an unmanned free balloon, flight follow the balloon and, to the extent possible, provide aircraft under your control separation from the balloon.

c. Forward balloon position information received from pilot reports or derived from radar returns to your supervisor for further dissemination.

d. If radar contact with the balloon is lost, broadcast an advisory to all aircraft operating in the airspace affected by the derelict balloon at 10-minute intervals continuing until the derelict balloon is no longer a factor.

PHRASEOLOGY-
ADVISORY TO ALL AIRCRAFT.

DERELICT BALLOON REPORTED IN THE VICINITY OF (location),

or

ESTIMATED IN VICINITY OF (location),

or

REPORTED OVER (location),

or

RADAR REPORTED OVER (location).

LAST REPORTED ALTITUDE/FLIGHT LEVEL AT (altitude/flight level as reported by operator or pilot report),

or

ALTITUDE/FLIGHT LEVEL UNKNOWN.

e. Transfer flight following responsibility as outlined in para 9-7-1, Application, subpara e.

REFERENCE-
FAAO 7210.3, Derelict Balloons/Objects, Para 18-6-2. ■

Section 2. Emergency Assistance

10-2-1. INFORMATION REQUIREMENTS

a. Start assistance as soon as enough information has been obtained upon which to act. Information requirements will vary, depending on the existing situation. Minimum required information for inflight emergencies is:

NOTE-
In the event of an ELT signal see para 10-2-10, Emergency Locator Transmitter (ELT) Signals.

1. Aircraft identification and type.
2. Nature of the emergency.
3. Pilot's desires.

b. After initiating action, obtain the following items or any other pertinent information from the pilot or aircraft operator, as necessary:

NOTE-
Normally, do not request this information from military fighter-type aircraft that are at low altitudes (i.e. on approach, immediately after departure, on a low level route, etc.). However, request the position of an aircraft that is not visually sighted or displayed on radar if the location is not given by the pilot.

1. Aircraft altitude.
2. Fuel remaining in time.
3. Pilot reported weather.
4. Pilot capability for IFR flight.
5. Time and place of last known position.
6. Heading since last known position.
7. Airspeed.
8. Navigation equipment capability.
9. NAVAID signals received.
10. Visible landmarks.
11. Aircraft color.
12. Number of people on board.
13. Point of departure and destination.
14. Emergency equipment on board.

10-2-2. FREQUENCY CHANGES

Although 121.5 MHz and 243.0 MHz are emergency frequencies, it might be best to keep the aircraft on the initial contact frequency. Change frequencies only when there is a valid reason.

10-2-3. AIRCRAFT ORIENTATION

Orientate an aircraft by the means most appropriate to the circumstances. Recognized methods include:

a. Radar.

b. DF.

c. NAVAID's.

d. Pilotage.

e. Sighting by other aircraft.

10-2-4. ALTITUDE CHANGE FOR IMPROVED RECEPTION

When you consider it necessary and if weather and circumstances permit, recommend that the aircraft maintain or increase altitude to improve communications, radar, or DF reception.

NOTE-
Aircraft with high-bypass turbofan engines (such as B747) encountering volcanic ash clouds have experienced total loss of power to all engines. Damage to engines due to volcanic ash ingestion increases as engine power is increased, therefore, climb while in the ash cloud is to be avoided where terrain permits.

REFERENCE-
AIM, Flight Operations in Volcanic Ash, Para 7-5-8.

10-2-5. EMERGENCY SITUATIONS

Consider that an aircraft emergency exists and inform the RCC or ARTCC and alert the appropriate DF facility when:

NOTE-
1. *USAF facilities are only required to notify the ARTCC.*

2. *The requirement to alert DF facilities may be deleted if radar contact will be maintained throughout the duration of the emergency.*

a. An emergency is declared by either:

1. The pilot.
2. Facility personnel.

3. Officials responsible for the operation of the aircraft.

b. There is unexpected loss of radar contact and radio communications with any IFR or VFR aircraft.

c. Reports indicate it has made a forced landing, is about to do so, or its operating efficiency is so impaired that a forced landing will be necessary.

d. Reports indicate the crew has abandoned the aircraft or is about to do so.

e. An emergency radar beacon response is received.

NOTE-
*EN ROUTE. During Stage A operation, **Code 7700** causes EMRG to blink in field E of the data block.*

f. Intercept or escort aircraft services are required.

g. The need for ground rescue appears likely.

h. An Emergency Locator Transmitter (ELT) signal is heard or reported.

REFERENCE-
FAAO 7110.65, Providing Assistance, Para 10-1-3.
FAAO 7110.65, Emergency Locator Transmitter (ELT) Signals, Para 10-2-10.

10-2-6. HIJACKED AIRCRAFT

When you observe a Mode 3/A **Code 7500,** do the following:

NOTE-
Military facilities will notify the appropriate FAA ARTCC, or the host nation agency responsible for en route control, of any indication that an aircraft is being hijacked. They will also provide full cooperation with the civil agencies in the control of such aircraft.

*EN ROUTE. During narrowband radar operations, **Code 7500** causes HIJK to blink in the data block.*

NOTE-
*Only nondiscrete **CODE 7500** will be decoded as the hijack code.*

a. Acknowledge and confirm receipt of **Code 7500** by asking the pilot to verify it. If the aircraft is not being subjected to unlawful interference, the pilot should respond to the query by broadcasting in the clear that he/she is not being subjected to unlawful interference. If the reply is in the affirmative or if no reply is received, do not question the pilot further but be responsive to the aircraft requests.

PHRASEOLOGY-
(Identification) (name of facility) VERIFY SQUAWKING 7500.

NOTE-
***Code 7500** is only assigned upon notification from the pilot that his/her aircraft is being subjected to unlawful interference. Therefore, pilots have been requested to refuse the assignment of **Code 7500** in any other situation and to inform the controller accordingly.*

b. Notify supervisory personnel of the situation.

c. Flight follow aircraft and use normal handoff procedures without requiring transmissions or responses by aircraft unless communications have been established by the aircraft.

d. If aircraft are dispatched to escort the hijacked aircraft, provide all possible assistance to the escort aircraft to aid in placing them in a position behind the hijacked aircraft.

NOTE-
Escort procedures are contained in FAAO 7610.4, Special Military Operations, Chapter 7, Escort of Hijacked Aircraft.

e. To the extent possible, afford the same control service to the aircraft operating VFR observed on the hijack code.

REFERENCE-
FAAO 7110.65, Code Monitor, Para 5-2-13.

10-2-7. VFR AIRCRAFT IN WEATHER DIFFICULTY

a. If VFR aircraft requests assistance when it encounters or is about to encounter IFR weather conditions, request the aircraft to contact the appropriate control facility. Inform that facility of the situation. If the aircraft is unable to communicate with the control facility, relay information and clearances.

b. The following shall be accomplished on a Mode C equipped VFR aircraft which is in emergency but no longer requires the assignment of ***Code 7700:***

1. *TERMINAL.* Assign a beacon code that will permit terminal minimum safe altitude warning (MSAW) alarm processing.

2. *EN ROUTE.* An appropriate keyboard entry shall be made to ensure en route MSAW (EMSAW) alarm processing.

10-2-8. RADAR ASSISTANCE TO VFR AIRCRAFT IN WEATHER DIFFICULTY

a. If a VFR aircraft requests radar assistance when it encounters or is about to encounter IFR weather conditions, ask the pilot if he/she is qualified for and capable of conducting IFR flight.

b. If the pilot states he/she is qualified for and capable of IFR flight, request him/her to file an IFR flight plan and then issue clearance to destination airport, as appropriate.

c. If the pilot states he/she is not qualified for or not capable of conducting IFR flight, or if he/she refuses to file an IFR flight plan, take whichever of the following actions is appropriate:

1. Inform the pilot of airports where VFR conditions are reported, provide other available pertinent weather information, and ask if he/she will elect to conduct VFR flight to such an airport.

2. If the action in subpara 1 above is not feasible or the pilot declines to conduct VFR flight to another airport, provide radar assistance if the pilot:

(a) Declares an emergency.

(b) Refuses to declare an emergency and you have determined the exact nature of the radar services the pilot desires.

3. If the aircraft has already encountered IFR conditions, inform the pilot of the appropriate terrain/obstacle clearance minimum altitude. If the aircraft is below appropriate terrain/obstacle clearance minimum altitude and sufficiently accurate position information has been received or radar identification is established, furnish a heading or radial on which to climb to reach appropriate terrain/obstacle clearance minimum altitude.

d. The following shall be accomplished on a Mode C equipped VFR aircraft which is in emergency but no longer requires the assignment of ***Code 7700:***

1. *TERMINAL.* Assign a beacon code that will permit terminal minimum safe altitude warning (MSAW) alarm processing.

2. *EN ROUTE.* An appropriate keyboard entry shall be made to ensure en route MSAW (EMSAW) alarm processing.

10-2-9. RADAR ASSISTANCE TECHNIQUES

Use the following techniques to the extent possible when you provide radar assistance to a pilot not qualified to operate in IFR conditions:

a. Avoid radio frequency changes except when necessary to provide a clear communications channel.

b. Make turns while the aircraft is in VFR conditions so it will be in a position to fly a straight course while in IFR conditions.

c. Have pilot lower gear and slow aircraft to approach speed while in VFR conditions.

d. Avoid requiring a climb or descent while in a turn if in IFR conditions.

e. Avoid abrupt maneuvers.

f. Vector aircraft to VFR conditions.

g. The following shall be accomplished on a Mode C equipped VFR aircraft which is in emergency but no longer requires the assignment of Code 7700:

1. *TERMINAL.* Assign a beacon code that will permit terminal minimum safe altitude warning (MSAW) alarm processing.

2. *EN ROUTE.* An appropriate keyboard entry shall be made to ensure en route MSAW (EMSAW) alarm processing.

10-2-10. EMERGENCY LOCATOR TRANSMITTER (ELT) SIGNALS

When an ELT signal is heard or reported:

a. *EN ROUTE.* Notify the Rescue Coordination Center (RCC).

NOTE-
FAA Form 7210-8, ELT INCIDENT, contains standardized format for coordination with the RCC.

REFERENCE-
FAAO 7210.3, FAA Form 7210-8, ELT Incident, Para 9-3-1.

b. *TERMINAL.* Notify the ARTCC which will coordinate with the RCC.

NOTE-
1. Operational ground testing of emergency locator transmitters (ELT's) has been authorized during the first 5 minutes of each hour. To avoid confusing the tests with an actual alarm, the testing is restricted to no more than three audio sweeps.

2. Controllers can expect pilots to report aircraft position and time the signal was first heard, aircraft position and time the signal was last heard, aircraft position at maximum signal strength, flight altitude, and frequency of the emergency signal (121.5/243.0). (See AIM, Emergency Locator Transmitter (ELT), Para 6-2-5.)

c. *EN ROUTE.* Request DF facilities obtain fixes or bearings on signal. Forward bearings or fixes obtained plus any other pertinent information to the RCC.

d. *TERMINAL.* Attempt to obtain fixes or bearings on the signal.

e. Solicit the assistance of other aircraft known to be operating in the signal area.

f. *TERMINAL.* Forward fixes or bearings and any other pertinent information to the ARTCC.

NOTE-
Fix information in relation to a VOR or VORTAC (radial-distance) facilitates accurate ELT plotting by RCC and should be provided when possible.

g. *EN ROUTE.* When the ELT signal strength indicates the signal may be emanating from somewhere on an airport or vicinity thereof, notify the on-site airway facilities personnel and the Regional Operations Center (ROC) for their actions. This action is in addition to the above.

h. *TERMINAL.* When the ELT signal strength indicates the signal may be emanating from somewhere on the airport or vicinity thereof, notify the on-site airway facilities personnel and the ARTCC for their action. This action is in addition to the above.

i. Air Traffic personnel shall not leave their required duty stations to locate an ELT signal source.

NOTE-
Portable handcarried receivers assigned to air traffic facilities (where no airway facilities personnel are available) may be loaned to responsible airport personnel or local authorities to assist in locating the ELT signal source.

j. *EN ROUTE.* Notify the RCC, the ROC, and alerted DF facilities if signal source is located/terminated.

k. *TERMINAL.* Notify the ARTCC if signal source is located/terminated.

REFERENCE-
FAAO 7110.65, Responsibility, Para 10-1-4.
FAAO 7110.65, Information Requirements, Para 10-2-1.

10-2-11. AIRCRAFT BOMB THREATS

a. When information is received from any source that a bomb has been placed on, in, or near an aircraft for the purpose of damaging or destroying such aircraft, notify your supervisor or the facility air traffic manager. If the threat is general in nature, handle it as a "Suspicious Activity." When the threat is targeted against a specific aircraft and you are in contact with the suspect aircraft, take the following actions as appropriate:

NOTE-
1. Facility supervisors are expected to notify the appropriate offices, agencies, operators/air carriers according to applicable plans, directives, and FAAO 7210.3, Handling Bomb Threat Incidents, Para 2-1-8, or applicable military directives.

2. "Suspicious activity" is covered in FAAO 7210.3, Suspicious Activities, Para 2-7-6. Military facilities would report a "general" threat through the chain of command or according to service directives.

1. Advise the pilot of the threat.

2. Inform the pilot that technical assistance can be obtained from an FAA aviation explosives expert.

NOTE-
An FAA aviation explosive expert is on call at all times and may be contacted by calling the FAA Operations Center, Washington, DC, Area Code 202-267-3333, ETN 521-0111, or DSN 667-5592. Technical advice can be relayed to assist civil or military air crews in their search for a bomb and in determining what precautionary action to take if one is found.

3. Ask the pilot if he/she desires to climb or descend to an altitude that would equalize or reduce the outside air pressure/existing cabin air pressure differential. Issue or relay an appropriate clearance considering MEA, MOCA, MRA, and weather.

NOTE-
Equalizing existing cabin air pressure with outside air pressure is a key step which the pilot may wish to take to minimize the damage potential of a bomb.

4. Handle the aircraft as an emergency and/or provide the most expeditious handling possible with respect to the safety of other aircraft, ground facilities, and personnel.

NOTE-
Emergency handling is discretionary and should be based on the situation. With certain types of threats, plans may call for a low-key action or response.

5. Issue or relay clearances to a new destination if requested.

6. When a pilot requests technical assistance or if it is apparent that a pilot may need such assistance, do NOT suggest what actions the pilot should take concerning a bomb, but obtain the following information and notify your supervisor who will contact the FAA aviation explosives expert:

Appendix B.

Aircraft Information

Helicopters/Rotorcrafts

TYPE ENGINE ABBREVIATIONS

P	piston
T	jet/turboprop
J	jet

CLIMB AND DESCENT RATES

Climb and descent rates based on average en route climb/descent profiles at median weight between maximum gross takeoff and landing weights.

SRS

SRS means "same runway separation;" categorization criteria is specified in para 3-9-6, Same Runway Separation.

MANUFACTURERS

Listed under the primary manufacturer are other aircraft manufacturers who also make versions of some of the aircraft in that group.

AEROSPATIALE (France)

(Also ATLAS, CASA, CHANGHE, EUROCOPTER, HELIBRAS, HINDUSTAN, IAR, ICA, NURTANIO, NUSANTARA, REPUBLIC, SINGAPORE, SUD, WESTLAND)

Model	Type Designator	Description	Performance Information		
		Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.
Lama SA-315	LAMA	1T/S	1,000	1,000	I
Alouette 2	ALO2	1T/S	1,280	1,280	I
Alouette 3	ALO3	1T/S	1,500	1,500	I
Dauphine SA-360/361	S360	1T/S	1,400	1,500	I
Dauphine 2 SA-365C	S65C	2T/S	1,800	1,000	I
Ecurevil/AStar AS-350/550	AS50	1T/S	1,000	1,000	I
Gazelle SA-341/342	GAZL	1T/S	1,620	1,620	I
Puma SA-330 (CH-33, HT-19)	PUMA	2T/L	1,250	1,500	I
Super Puma AS 332/532, SA-330)	AS32	2T/L	1,250	1,500	I
Super Frelon SA-321/Z-8	FREL	3T/L	1,200	1,500	I
Twin Star AS-355/555	AS55	2T/S	1,350	1,300	I

AUGUSTA (Constuzioni Aeronautiche Giovanni Agusta SpA) (Italy)

(Also BELL, NUSANTARA, SABCA)

Model	Type Designator	Description	Performance Information		
		Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.
Model 147J-3B-1, Ranger	B47J	1P/S	500	500	I
Model A 109/A/A-II	A109	2T/S	1,620	1,500	I
Model 212 ASW, Griffon	B12	2T/S	1,420	1,420	I

BELL/BOEING

Model	Type Designator	Description	Performance Information		
		Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.
Osprey	V22	2P/L	-	-	II

BELL HELICOPTER TEXTRON (USA)

(Also AGUSTA, AIDC, COMMONWEALTH, DORNIER, FUJI, GLOBAL, KAWASAKI, NUSANTARA, TROOPER, UNC, WESTLAND)

Model	Type Designator	Description	Performance Information		
		Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.
Biglifter, Bell 204 ,205, 214A/B, AB-204	UH1	1T/S	1,500	1,500	I
Cobra	HUCO	1T/S	1,375	1,375	I
Jet Ranger/Long Ranger/Sea Ranger/ Kiowa/Model 206, Combat Scout	B06	1T/S	1,200	1,000	I
Huey/Iroquois/Model 205 A-1	UH1	1T/S	1,500	1,500	I
Ranger Model 47J	B47J	1P/S	1,000	1,000	I
Sioux/Model 47G, OH-13	B47G	1P/S	1,000	1,000	I
Twin Huey, Model 212, Model 214B/B-1, Model 412, Griffon	B12	2T/S	1,420	1,420	I
Model 214ST, Super Transport	BSTP	2T/S	1,420	1,420	I
Model 222, 230, 430	B222	2T/S	1,500	1,000	I

BOEING VERTOL COMPANY (USA)

(Also BOEING HELICOPTERS, KAWASAKI, MERIDIONALI, VERTOL)

Model	Type Designator	Description	Performance Information		
		Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.
Chinook, Model 234	H47	2T/L	1,500	1,500	I
Sea Knight 107, CH-113, Labrador	H46	2T/S+	2,130	2,130	I

BOLKOW (Germany)

(Also CASA, EUROCOPTER, MBB, MESSERSCHMITT-BOLKOW, NURTANIO, NUSANTARA, PADC)

Model	Type Designator	Description	Performance Information		
		Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.
Model 105, BO-105	B105	2T/S	1,500	1,500	I

BRANTLEY-HYNES HELICOPTER, INC. (USA)

(Also BRANTLEY, HYNES)

Model	Type Designator	Description	Performance Information		
		Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.
Model B-2/A/B, H-2	BRB2	1P/S	1,400	1,400	I
Model 305	B305	1P/S	1,300	1,300	I

ENSTROM CORP. (USA)

(Also WUHAN)

Model	Type Designator	Description	Performance Information		
		Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.
Falcon/Model F-28/A/C/F, Sentinel/ Model F-28-FP, Model 280, Shark	EN28	1P/S	800	800	I
Shark/Model 280FX, 28, Falcon, Sentinel	EN28	1P/S	1,200	1,200	I
Turbo Shark 480, TH-28	EN48	1P/S	1,500	1,500	I

FAIRCHILD/REPUBLIC (includes Hiller) (USA)

(Also FAIRCHILD HILLER, ROGERSON HILLER)

Model	Type Designator	Description	Performance Information		
		Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.
Hiller UH-12/Raven, HTE	UH12	1P/S	1,500	1,500	I

HILLER (See FAIRCHILD/REPUBLIC (USA))

HUGHES HELICOPTERS (See MCDONNELL-DOUGLAS HELICOPTERS (USA))

KAMAN AEROSPACE CORPORATION (USA)

Model	Type Designator	Description	Performance Information		
		Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.
H-2 Seasprite, Super Seasprite	H2	2T/L	2,400	2,400	I
Huskie 600-3/5	H43B	1T/L	2,000	2,000	I

KAWASAKI HEAVY INDUSTRIES LTD. (Japan)

(Also BOEING VERTOL, VERTOL)

Model	Type Designator	Description	Performance Information		
		Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.
KV-107/II, Sea Knight, Labrador, Voyaguer, CH-113	H46	2T/S+	1,500	1,500	I

MCDONNELL-DOUGLAS HELICOPTERS (includes Hughes Helicopters) (USA)

(Also AGUSTA, BREDANARDI, KAWASAKI, KOREAN AIR, NARDI, RACA, SCHWEIZER)

Model	Type Designator	Description	Performance Information		
		Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.
Model 77/Apache, Pethen, Longbow Apache	H64	2T/S+	1,500	1,500	I
Model 269, 200, 280, 300, Skynight, TH-55 Osage	H269	1P/S	1,000	1,000	I
Model 300/C	H269	1P/S	1,200	1,200	I
Model 500C, 369, 530F, Defender, Black Tiger, Night Fox, Lifter	H500	1P/S	1,500	1,500	I
Osage	H269	1P/S	1,000	1,000	I
Pawnee, Model 369, Model 500D/MD/MG	H500	1T/S	1,500	1,500	I

MESSERSCHMIDTT-BOLKOW-BLOHM (MBB) (FRG)

(Also BOLKOW, CASA, EUROCOPTER, MBB, NURTANIO, NUSANTARA, PADC)

Model	Type Designator	Description	Performance Information		
		Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.
Model BO 105	B105	2T/S	1,200	1,200	I

MBB/KAWASAKI (FRG/Japan)

Model	Type Designator	Description	Performance Information		
		Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.
Model BK 117	BK17	2T/S	1,500	1,500	I

ROBINSON HELICOPTER COMPANY INC. (USA)

Model	Type Designator	Description	Performance Information		
		Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.
Model R22	R22	1P/S	800	800	I

SCHWEIZER AIRCRAFT CORP. (USA)

(Also BREDANARDI, HUGHES, KAWASAKI, NARDI)

Model	Type Designator	Description	Performance Information		
		Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.
Model 269C, 200, 280, 300, Skynight	H269	1P/S	1,000	1,000	I

SIKORSKY AIRCRAFT (USA)

(Also AGUSTA, ASTA, HAWKER DE HAVILLAND, HELIPRO, KOREAN AIR, MITSUBISHI, TUSAS, UNITED CANADA, VAT, WESTLAND)

Model	Type Designator	Description	Performance Information		
		Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.
Blackhawk S-70, WS-70, Seahawk, Pavehawk, Rescuehawk, Thunderhawk, Jayhawk, Oceanhawk, Deserthawk, Yanshuf, LAMPS MK3, Blackhawk	H60	2T/S+	2,000	2,000	I
Chickasaw S-55, H-19, HO4S, HRS	S55P	1P/S	800	1,000	I
Choctaw/Seashore/Seaboat S-58, CH-34	S58P	1P/L	1,120	1,120	I
Model S-51	S51	1P/L	1,000	1,000	I
Model S-52, Hummingbird	S52	1P/L	950	1,000	I
Model S-62	S62	1T/S	1,020	1,000	I
Model S-76, Spirit, Eagle	S76	2T/S	1,300	1,300	I
S-61R (CH-3, HH-3, Pelican)	S61R	2T/L	1,500	1,500	I
S-61A/B/D/L/N Sea King, Commando, CH-124	S61	2T/L	1,500	1,500	I
Sea Stallion S-65, Yasur	H53	2T/L	1,500	1,500	I
Skycrane S-64E/F, Tarhe S-64	S64	2T/L	1,300	1,300	I

WESTLAND HELICOPTERS LTD. (UK)

Model	Type Designator	Description	Performance Information		
		Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.
WG 30	WG30	2T/S	1,200	1,200	I

PILOT/CONTROLLER GLOSSARY

PURPOSE

a. This Glossary was compiled to promote a common understanding of the terms used in the Air Traffic Control system. It includes those terms which are intended for pilot/controller communications. Those terms most frequently used in pilot/controller communications are printed in ***bold italics***. The definitions are primarily defined in an operational sense applicable to both users and operators of the National Airspace System. Use of the Glossary will preclude any misunderstandings concerning the system's design, function, and purpose.

b. Because of the international nature of flying, terms used in the Lexicon, published by the International Civil Aviation Organization (ICAO), are included when they differ from FAA definitions. These terms are followed by "[ICAO]." For the reader's convenience, there are also cross references to related terms in other parts of the Glossary and to other documents, such as the Federal Aviation Regulations (FAR's) and the Aeronautical Information Manual (AIM).

c. This Glossary will be revised, as necessary, to maintain a common understanding of the system.

EXPLANATION OF CHANGES

a. Terms Added:

AIRPORT ARRIVAL RATE (AAR) (ATP-100)
AIRPORT DEPARTURE RATE (ADR) (ATP-100)
AIRPORT MOVEMENT AREA SAFETY SYSTEM (AMASS) (ATP-120)
AUTOMATED TERMINAL TRACKING SYSTEM (ATTS) (ATP-100)
CERTIFIED TOWER RADAR DISPLAY (CTRD) (ATP-110)
MICRO-EN ROUTE AUTOMATED RADAR TRACKING SYSTEM (M-EARTS) (ATP-100)
TRAFFIC SITUATION DISPLAY (TSD) (ATP-100)
WIDE-AREA AUGMENTATION SYSTEM (WAAS) (ATP-402)

b. Terms Modified:

APPROACH GATE (ATP-110)
CIRCLE-TO-LAND MANEUVER (ATP-120)
EXPEDITE (ATP-110)
GLIDESLOPE INTERCEPT ALTITUDE (ATP-110)
IMMEDIATELY (ATP-110)
OFFSHORE/CONTROL AIRSPACE AREA (ATP-130)

c. Terms Deleted:

AIRCRAFT SITUATION DISPLAY (ASD) (ATP-100)
AIRPORT ACCEPTANCE RATE (AAR) (ATP-100)
EN ROUTE AUTOMATED RADAR TRACKING SYSTEM (EARTS) (ATP-120)

A

AAI-
(See ARRIVAL AIRCRAFT INTERVAL.)

AAR-
(See AIRPORT ARRIVAL RATE.)

ABBREVIATED IFR FLIGHT PLANS- An authorization by ATC requiring pilots to submit only that information needed for the purpose of ATC. It includes only a small portion of the usual IFR flight plan information. In certain instances, this may be only aircraft identification, location, and pilot request. Other information may be requested if needed by ATC for separation/control purposes. It is frequently used by aircraft which are airborne and desire an instrument approach or by aircraft which are on the ground and desire a climb to VFR-on-top.
(See VFR-ON-TOP.)
(Refer to AIM.)

ABEAM- An aircraft is "abeam" a fix, point, or object when that fix, point, or object is approximately 90 degrees to the right or left of the aircraft track. Abeam indicates a general position rather than a precise point.

ABORT- To terminate a preplanned aircraft maneuver; e.g., an aborted takeoff.

ACC [ICAO]-
(See AREA CONTROL CENTER.)

ACCELERATE-STOP DISTANCE AVAILABLE- The runway plus stopway length declared available and suitable for the acceleration and deceleration of an airplane aborting a takeoff.

ACCELERATE-STOP DISTANCE AVAILABLE [ICAO]- The length of the take-off run available plus the length of the stopway if provided.

ACDO-
(See AIR CARRIER DISTRICT OFFICE.)

ACKNOWLEDGE- Let me know that you have received my message.
(See ICAO term ACKNOWLEDGE.)

ACKNOWLEDGE [ICAO]- Let me know that you have received and understood this message.

ACLS-
(See AUTOMATIC CARRIER LANDING SYSTEM.)

ACLT-
(See ACTUAL CALCULATED LANDING TIME.)

ACROBATIC FLIGHT- An intentional maneuver involving an abrupt change in an aircraft's attitude, an abnormal attitude, or abnormal acceleration not necessary for normal flight.
(Refer to Part 91.)
(See ICAO term ACROBATIC FLIGHT.)

ACROBATIC FLIGHT [ICAO]- Maneuvers intentionally performed by an aircraft involving an abrupt change in its attitude, an abnormal attitude, or an abnormal variation in speed.

ACTIVE RUNWAY-
(See RUNWAY IN USE/ACTIVE RUNWAY/DUTY RUNWAY.)

ACTUAL CALCULATED LANDING TIME- ACLT is a flight's frozen calculated landing time. An actual time determined at freeze calculated landing time (FCLT) or meter list display interval (MLDI) for the adapted vertex for each arrival aircraft based upon runway configuration, airport acceptance rate, airport arrival delay period, and other metered arrival aircraft. This time is either the vertex time of arrival (VTA) of the aircraft or the tentative calculated landing time (TCLT)/ACLT of the previous aircraft plus the arrival aircraft interval (AAI), whichever is later. This time will not be updated in response to the aircraft's progress.

ACTUAL NAVIGATION PERFORMANCE (ANP)-
(See Required Navigation Performance)

ADDITIONAL SERVICES- Advisory information provided by ATC which includes but is not limited to the following:

a. Traffic advisories.

b. Vectors, when requested by the pilot, to assist aircraft receiving traffic advisories to avoid observed traffic.

c. Altitude deviation information of 300 feet or more from an assigned altitude as observed on a verified (reading correctly) automatic altitude readout (Mode C.)

d. Advisories that traffic is no longer a factor.

e. Weather and chaff information.

f. Weather assistance.

g. Bird activity information.

h. Holding pattern surveillance. Additional services are provided to the extent possible contingent only upon the controller's capability to fit them into the perfor-

mance of higher priority duties and on the basis of limitations of the radar, volume of traffic, frequency congestion, and controller workload. The controller has complete discretion for determining if he/she is able to provide or continue to provide a service in a particular case. The controller's reason not to provide or continue to provide a service in a particular case is not subject to question by the pilot and need not be made known to him/her.

(See TRAFFIC ADVISORIES.)

(Refer to AIM.)

ADF-

(See AUTOMATIC DIRECTION FINDER.)

ADIZ-

(See AIR DEFENSE IDENTIFICATION ZONE.)

ADLY-

(See ARRIVAL DELAY.)

ADMINISTRATOR- The Federal Aviation Administrator or any person to whom he/she has delegated his/her authority in the matter concerned.

ADR-

(See AIRPORT DEPARTURE RATE.)

ADVISE INTENTIONS- Tell me what you plan to do.

ADVISORY- Advice and information provided to assist pilots in the safe conduct of flight and aircraft movement.

(See ADVISORY SERVICE.)

ADVISORY FREQUENCY- The appropriate frequency to be used for Airport Advisory Service.

(See LOCAL AIRPORT ADVISORY.)

(See UNICOM.)

(Refer to ADVISORY CIRCULAR NO. 90-42.)

(Refer to AIM.)

ADVISORY SERVICE- Advice and information provided by a facility to assist pilots in the safe conduct of flight and aircraft movement.

(See LOCAL AIRPORT ADVISORY.)

(See TRAFFIC ADVISORIES.)

(See SAFETY ALERT.)

(See ADDITIONAL SERVICES.)

(See RADAR ADVISORY.)

(See EN ROUTE FLIGHT ADVISORY SERVICE.)

(Refer to AIM.)

AERIAL REFUELING- A procedure used by the military to transfer fuel from one aircraft to another during flight.

(Refer to VFR/IFR Wall Planning Charts.)

AERODROME- A defined area on land or water (including any buildings, installations and equipment) intended to be used either wholly or in part for the arrival, departure, and movement of aircraft.

AERODROME BEACON [ICAO]- Aeronautical beacon used to indicate the location of an aerodrome from the air.

AERODROME CONTROL SERVICE [ICAO]- Air traffic control service for aerodrome traffic.

AERODROME CONTROL TOWER [ICAO]- A unit established to provide air traffic control service to aerodrome traffic.

AERODROME ELEVATION [ICAO]- The elevation of the highest point of the landing area.

AERODROME TRAFFIC CIRCUIT [ICAO]- The specified path to be flown by aircraft operating in the vicinity of an aerodrome.

AERONAUTICAL BEACON- A visual NAVAID displaying flashes of white and/or colored light to indicate the location of an airport, a heliport, a landmark, a certain point of a Federal airway in mountainous terrain, or an obstruction.

(See AIRPORT ROTATING BEACON.)

(Refer to AIM.)

AERONAUTICAL CHART- A map used in air navigation containing all or part of the following: topographic features, hazards and obstructions, navigation aids, navigation routes, designated airspace, and airports. Commonly used aeronautical charts are:

a. Sectional Aeronautical Charts (1:500,000)- Designed for visual navigation of slow or medium speed aircraft. Topographic information on these charts features the portrayal of relief and a judicious selection of visual check points for VFR flight. Aeronautical information includes visual and radio aids to navigation, airports, controlled airspace, restricted areas, obstructions, and related data.

b. VFR Terminal Area Charts (1:250,000)- Depict Class B airspace which provides for the control or segregation of all the aircraft within Class B airspace. The chart depicts topographic information and aeronautical information which includes visual and radio aids to navigation, airports, controlled airspace, restricted areas, obstructions, and related data.

c. World Aeronautical Charts (WAC) (1:1,000,000)- Provide a standard series of aeronautical charts covering land areas of the world at a size and scale convenient for navigation by moderate speed aircraft. Topographic information includes cities and towns, principal roads,

railroads, distinctive landmarks, drainage, and relief. Aeronautical information includes visual and radio aids to navigation, airports, airways, restricted areas, obstructions, and other pertinent data.

d. En Route Low Altitude Charts- Provide aeronautical information for en route instrument navigation (IFR) in the low altitude stratum. Information includes the portrayal of airways, limits of controlled airspace, position identification and frequencies of radio aids, selected airports, minimum en route and minimum obstruction clearance altitudes, airway distances, reporting points, restricted areas, and related data. Area charts, which are a part of this series, furnish terminal data at a larger scale in congested areas.

e. En Route High Altitude Charts- Provide aeronautical information for en route instrument navigation (IFR) in the high altitude stratum. Information includes the portrayal of jet routes, identification and frequencies of radio aids, selected airports, distances, time zones, special use airspace, and related information.

f. Instrument Approach Procedures (IAP) Charts- Portray the aeronautical data which is required to execute an instrument approach to an airport. These charts depict the procedures, including all related data, and the airport diagram. Each procedure is designated for use with a specific type of electronic navigation system including NDB, TACAN, VOR, ILS/MLS, and RNAV. These charts are identified by the type of navigational aid(s) which provide final approach guidance.

g. Instrument Departure Procedure (DP) Charts- Designed to expedite clearance delivery and to facilitate transition between takeoff and en route operations. Each DP is presented as a separate chart and may serve a single airport or more than one airport in a given geographical location.

h. Standard Terminal Arrival (STAR) Charts- Designed to expedite air traffic control arrival procedures and to facilitate transition between en route and instrument approach operations. Each STAR procedure is presented as a separate chart and may serve a single airport or more than one airport in a given geographical location.

i. Airport Taxi Charts- Designed to expedite the efficient and safe flow of ground traffic at an airport. These charts are identified by the official airport name; e.g., Washington National Airport.

(See ICAO term AERONAUTICAL CHART.)

AERONAUTICAL CHART [ICAO]- A representation of a portion of the earth, its culture and relief, specifically designated to meet the requirements of air navigation.

AERONAUTICAL INFORMATION MANUAL- A primary FAA publication whose purpose is to instruct airmen about operating in the National Airspace System of the U.S. It provides basic flight information, ATC Procedures and general instructional information concerning health, medical facts, factors affecting flight safety, accident and hazard reporting, and types of aeronautical charts and their use.

AERONAUTICAL INFORMATION PUBLICATION [AIP] [ICAO]- A publication issued by or with the authority of a State and containing aeronautical information of a lasting character essential to air navigation.

A/FD-
(See AIRPORT/FACILITY DIRECTORY.)

AFFIRMATIVE- Yes.

AIM-
(See AERONAUTICAL INFORMATION MANUAL.)

AIP [ICAO]-
(See AERONAUTICAL INFORMATION PUBLICATION.)

AIRBORNE DELAY- Amount of delay to be encountered in airborne holding.

AIR CARRIER DISTRICT OFFICE- An FAA field office serving an assigned geographical area, staffed with Flight Standards personnel serving the aviation industry and the general public on matters related to the certification and operation of scheduled air carriers and other large aircraft operations.

AIRCRAFT- Device(s) that are used or intended to be used for flight in the air, and when used in air traffic control terminology, may include the flight crew.
(See ICAO term AIRCRAFT.)

AIRCRAFT [ICAO]- Any machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth's surface.

AIRCRAFT APPROACH CATEGORY- A grouping of aircraft based on a speed of 1.3 times the stall speed in the landing configuration at maximum gross landing weight. An aircraft shall fit in only one category. If it is necessary to maneuver at speeds in excess of the upper limit of a speed range for a category, the minimums for the next higher category should be used. For example, an aircraft which falls in Category A, but is circling to

land at a speed in excess of 91 knots, should use the approach Category B minimums when circling to land. The categories are as follows:

a. Category A- Speed less than 91 knots.

b. Category B- Speed 91 knots or more but less than 121 knots.

c. Category C- Speed 121 knots or more but less than 141 knots.

d. Category D- Speed 141 knots or more but less than 166 knots.

e. Category E- Speed 166 knots or more.

(Refer to Part 97.)

AIRCRAFT CLASSES- For the purposes of Wake Turbulence Separation Minima, ATC classifies aircraft as Heavy, Large, and Small as follows:

a. Heavy- Aircraft capable of takeoff weights of more than 255,000 pounds whether or not they are operating at this weight during a particular phase of flight.

b. Large- Aircraft of more than 41,000 pounds, maximum certificated takeoff weight, up to 255,000 pounds.

c. Small- Aircraft of 41,000 pounds or less maximum certificated takeoff weight.

(Refer to AIM.)

AIRCRAFT SURGE LAUNCH AND RECOVERY- Procedures used at USAF bases to provide increased launch and recovery rates in instrument flight rules conditions. ASLAR is based on:

a. Reduced separation between aircraft which is based on time or distance. Standard arrival separation applies between participants including multiple flights until the DRAG point. The DRAG point is a published location on an ASLAR approach where aircraft landing second in a formation slows to a predetermined airspeed. The DRAG point is the reference point at which MARSA applies as expanding elements effect separation within a flight or between subsequent participating flights.

b. ASLAR procedures shall be covered in a Letter of Agreement between the responsible USAF military ATC facility and the concerned Federal Aviation Administration facility. Initial Approach Fix spacing requirements are normally addressed as a minimum.

AIR DEFENSE EMERGENCY- A military emergency condition declared by a designated authority. This condition exists when an attack upon the continental U.S., Alaska, Canada, or U.S. installations in Greenland by hostile aircraft or missiles is considered probable, is imminent, or is taking place.

(Refer to AIM.)

AIR DEFENSE IDENTIFICATION ZONE- The area of airspace over land or water, extending upward from the surface, within which the ready identification, the location, and the control of aircraft are required in the interest of national security.

a. Domestic Air Defense Identification Zone. An ADIZ within the United States along an international boundary of the United States.

b. Coastal Air Defense Identification Zone. An ADIZ over the coastal waters of the United States.

c. Distant Early Warning Identification Zone (DEWIZ.) An ADIZ over the coastal waters of the State of Alaska.

ADIZ locations and operating and flight plan requirements for civil aircraft operations are specified in FAR Part 99.

(Refer to AIM.)

AIRMAN'S METEOROLOGICAL INFORMATION-

(See AIRMET.)

AIRMET- In-flight weather advisories issued only to amend the area forecast concerning weather phenomena which are of operational interest to all aircraft and potentially hazardous to aircraft having limited capability because of lack of equipment, instrumentation, or pilot qualifications. AIRMET's concern weather of less severity than that covered by SIGMET's or Convective SIGMET's. AIRMET's cover moderate icing, moderate turbulence, sustained winds of 30 knots or more at the surface, widespread areas of ceilings less than 1,000 feet and/or visibility less than 3 miles, and extensive mountain obscurement.

(See AWW.)

(See SIGMET.)

(See CONVECTIVE SIGMET.)

(See CWA.)

(Refer to AIM.)

AIR NAVIGATION FACILITY- Any facility used in, available for use in, or designed for use in, aid of air navigation, including landing areas, lights, any apparatus or equipment for disseminating weather information, for signaling, for radio-directional finding, or for radio or other electrical communication, and any other structure or mechanism having a similar purpose for

guiding or controlling flight in the air or the landing and take-off of aircraft.

(See NAVIGATIONAL AID.)

AIRPORT- An area on land or water that is used or intended to be used for the landing and takeoff of aircraft and includes its buildings and facilities, if any.

AIRPORT ADVISORY AREA- The area within ten miles of an airport without a control tower or where the tower is not in operation, and on which a Flight Service Station is located.

(See LOCAL AIRPORT ADVISORY.)

(Refer to AIM.)

AIRPORT ARRIVAL RATE (AAR)- A dynamic input parameter specifying the number of arriving aircraft which an airport or airspace can accept from the ARTCC per hour. The AAR is used to calculate the desired interval between successive arrival aircraft.

AIRPORT DEPARTURE RATE (ADR)- A dynamic parameter specifying the number of aircraft which can depart an airport and the airspace can accept per hour.

AIRPORT ELEVATION- The highest point of an airport's usable runways measured in feet from mean sea level.

(See TOUCHDOWN ZONE ELEVATION.)

(See ICAO term AERODROME ELEVATION.)

AIRPORT/FACILITY DIRECTORY- A publication designed primarily as a pilot's operational manual containing all airports, seaplane bases, and heliports open to the public including communications data, navigational facilities, and certain special notices and procedures. This publication is issued in seven volumes according to geographical area.

AIRPORT INFORMATION AID-

(See AIRPORT INFORMATION DESK.)

AIRPORT INFORMATION DESK- An airport unmanned facility designed for pilot self-service briefing, flight planning, and filing of flight plans.

(Refer to AIM.)

AIRPORT LIGHTING- Various lighting aids that may be installed on an airport. Types of airport lighting include:

a. Approach Light System (ALS)- An airport lighting facility which provides visual guidance to landing aircraft by radiating light beams in a directional pattern by which the pilot aligns the aircraft with the extended centerline of the runway on his final approach for landing. Condenser-Discharge Sequential Flashing Lights/Sequenced Flashing Lights may be installed in conjunction with the ALS at some airports. Types of Approach Light Systems are:

1. ALSF-1- Approach Light System with Sequenced Flashing Lights in ILS Cat-I configuration.

2. ALSF-2- Approach Light System with Sequenced Flashing Lights in ILS Cat-II configuration. The ALSF-2 may operate as an SSALR when weather conditions permit.

3. SSALF- Simplified Short Approach Light System with Sequenced Flashing Lights.

4. SSALR- Simplified Short Approach Light System with Runway Alignment Indicator Lights.

5. MALSF- Medium Intensity Approach Light System with Sequenced Flashing Lights.

6. MALSR- Medium Intensity Approach Light System with Runway Alignment Indicator Lights.

7. LDIN- Lead-in-light system- Consists of one or more series of flashing lights installed at or near ground level that provides positive visual guidance along an approach path, either curving or straight, where special problems exist with hazardous terrain, obstructions, or noise abatement procedures.

8. RAIL- Runway Alignment Indicator Lights- Sequenced Flashing Lights which are installed only in combination with other light systems.

9. ODALS- Omnidirectional Approach Lighting System consists of seven omnidirectional flashing lights located in the approach area of a nonprecision runway. Five lights are located on the runway centerline extended with the first light located 300 feet from the threshold and extending at equal intervals up to 1,500 feet from the threshold. The other two lights are located, one on each side of the runway threshold, at a lateral distance of 40 feet from the runway edge, or 75 feet from the runway edge when installed on a runway equipped with a VASI.

(Refer to FAAO 6850.2, VISUAL GUIDANCE LIGHTING SYSTEMS.)

b. Runway Lights/Runway Edge Lights- Lights having a prescribed angle of emission used to define the lateral limits of a runway. Runway lights are uniformly spaced at intervals of approximately 200 feet, and the intensity may be controlled or preset.

c. Touchdown Zone Lighting- Two rows of transverse light bars located symmetrically about the runway centerline normally at 100 foot intervals. The basic system extends 3,000 feet along the runway.

d. Runway Centerline Lighting- Flush centerline lights spaced at 50-foot intervals beginning 75 feet from the landing threshold and extending to within 75 feet of the opposite end of the runway.

e. Threshold Lights- Fixed green lights arranged symmetrically left and right of the runway centerline, identifying the runway threshold.

f. Runway End Identifier Lights (REIL)- Two synchronized flashing lights, one on each side of the runway threshold, which provide rapid and positive identification of the approach end of a particular runway.

g. Visual Approach Slope Indicator (VASI)- An airport lighting facility providing vertical visual approach slope guidance to aircraft during approach to landing by radiating a directional pattern of high intensity red and white focused light beams which indicate to the pilot that he is "on path" if he sees red/white, "above path" if white/white, and "below path" if red/red. Some airports serving large aircraft have three-bar VASI's which provide two visual glide paths to the same runway.

h. Boundary Lights- Lights defining the perimeter of an airport or landing area.
(Refer to AIM.)

AIRPORT MARKING AIDS- Markings used on runway and taxiway surfaces to identify a specific runway, a runway threshold, a centerline, a hold line, etc. A runway should be marked in accordance with its present usage such as:

a. Visual.

b. Nonprecision instrument.

c. Precision instrument.
(Refer to AIM.)

AIRPORT MOVEMENT AREA SAFETY SYSTEM (AMASS)- A software enhancement to ASDE radar which provides logic predicting the path of aircraft landing and/or departing, and aircraft and/or vehicular movements on runways. Visual and aural alarms are activated when logic projects a potential collision.

AIRPORT REFERENCE POINT (ARP) - The approximate geometric center of all usable runway surfaces.

AIRPORT RESERVATION OFFICE- Office responsible for monitoring the operation of the high density rule. Receives and processes requests for IFR operations at high density traffic airports.

AIRPORT ROTATING BEACON- A visual NAVAID operated at many airports. At civil airports, alternating white and green flashes indicate the location of the airport. At military airports, the beacons flash alternately white and green, but are differentiated from civil beacons by dualpeaked (two quick) white flashes between the green flashes.
(See SPECIAL VFR OPERATIONS.)
(See INSTRUMENT FLIGHT RULES.)
(Refer to AIM.)
(See ICAO term AERODROME BEACON.)

AIRPORT SURFACE DETECTION EQUIPMENT- Radar equipment specifically designed to detect all principal features on the surface of an airport, including aircraft and vehicular traffic, and to present the entire image on a radar indicator console in the control tower. Used to augment visual observation by tower personnel of aircraft and/or vehicular movements on runways and taxiways.

AIRPORT SURVEILLANCE RADAR- Approach control radar used to detect and display an aircraft's position in the terminal area. ASR provides range and azimuth information but does not provide elevation data. Coverage of the ASR can extend up to 60 miles.

AIRPORT TAXI CHARTS-
(See AERONAUTICAL CHART.)

AIRPORT TRAFFIC CONTROL SERVICE- A service provided by a control tower for aircraft operating on the movement area and in the vicinity of an airport.
(See MOVEMENT AREA.)
(See TOWER.)
(See ICAO term AERODROME CONTROL SERVICE.)

AIRPORT TRAFFIC CONTROL TOWER-
(See TOWER.)

AIR ROUTE SURVEILLANCE RADAR- Air route traffic control center (ARTCC) radar used primarily to detect and display an aircraft's position while en route between terminal areas. The ARSR enables controllers to provide radar air traffic control service when aircraft are within the ARSR coverage. In some instances, ARSR may enable an ARTCC to provide terminal radar services similar to but usually more limited than those provided by a radar approach control.

AIR ROUTE TRAFFIC CONTROL CENTER- A facility established to provide air traffic control service

to aircraft operating on IFR flight plans within controlled airspace and principally during the en route phase of flight. When equipment capabilities and controller workload permit, certain advisory/assistance services may be provided to VFR aircraft.

(See NAS STAGE A.)

(See EN ROUTE AIR TRAFFIC CONTROL SERVICES.)

(Refer to AIM.)

AIRSPACE HIERARCHY- Within the airspace classes, there is a hierarchy and, in the event of an overlap of airspace: Class A preempts Class B, Class B preempts Class C, Class C preempts Class D, Class D preempts Class E, and Class E preempts Class G.

AIRSPEED- The speed of an aircraft relative to its surrounding air mass. The unqualified term "airspeed" means one of the following:

a. Indicated Airspeed- The speed shown on the aircraft airspeed indicator. This is the speed used in pilot/controller communications under the general term "airspeed."

(Refer to FAR Part 1.)

b. True Airspeed- The airspeed of an aircraft relative to undisturbed air. Used primarily in flight planning and en route portion of flight. When used in pilot/controller communications, it is referred to as "true airspeed" and not shortened to "airspeed."

AIRSTART- The starting of an aircraft engine while the aircraft is airborne, preceded by engine shutdown during training flights or by actual engine failure.

AIR TAXI- Used to describe a helicopter/VTOL aircraft movement conducted above the surface but normally not above 100 feet AGL. The aircraft may proceed either via hover taxi or flight at speeds more than 20 knots. The pilot is solely responsible for selecting a safe airspeed/altitude for the operation being conducted.

(See HOVER TAXI.)

(Refer to AIM.)

AIR TRAFFIC- Aircraft operating in the air or on an airport surface, exclusive of loading ramps and parking areas.

(See ICAO term AIR TRAFFIC.)

AIR TRAFFIC [ICAO]- All aircraft in flight or operating on the manoeuvering area of an aerodrome.

AIR TRAFFIC CLEARANCE- An authorization by air traffic control for the purpose of preventing collision between known aircraft, for an aircraft to proceed under specified traffic conditions within controlled airspace. The pilot-in-command of an aircraft may not deviate from the provisions of a visual flight rules (VFR) or instrument flight rules (IFR) air traffic clearance except in an emergency or unless an amended clearance has been obtained. Additionally, the pilot may request a different clearance from that which has been issued by air traffic control (ATC) if information available to the pilot makes another course of action more practicable or if aircraft equipment limitations or company procedures forbid compliance with the clearance issued. Pilots may also request clarification or amendment, as appropriate, any time a clearance is not fully understood, or considered unacceptable because of safety of flight. Controllers should, in such instances and to the extent of operational practicality and safety, honor the pilot's request. FAR Part 91.3(a) states: "The pilot in command of an aircraft is directly responsible for, and is the final authority as to, the operation of that aircraft." THE PILOT IS RESPONSIBLE TO REQUEST AN AMENDED CLEARANCE if ATC issues a clearance that would cause a pilot to deviate from a rule or regulation, or in the pilot's opinion, would place the aircraft in jeopardy.

(See ATC INSTRUCTIONS.)

(See ICAO term AIR TRAFFIC CONTROL CLEARANCE.)

AIR TRAFFIC CONTROL- A service operated by appropriate authority to promote the safe, orderly and expeditious flow of air traffic.

(See ICAO term AIR TRAFFIC CONTROL SERVICE.)

AIR TRAFFIC CONTROL CLEARANCE [ICAO]- Authorization for an aircraft to proceed under conditions specified by an air traffic control unit.

Note 1: For convenience, the term air traffic control clearance is frequently abbreviated to clearance when used in appropriate contexts.

Note 2: The abbreviated term clearance may be prefixed by the words taxi, takeoff, departure, en route, approach or landing to indicate the particular portion of flight to which the air traffic control clearance relates.

AIR TRAFFIC CONTROL SERVICE-

(See AIR TRAFFIC CONTROL.)

AIR TRAFFIC CONTROL SERVICE [ICAO]- A service provided for the purpose of:

a. Preventing collisions:

1. Between aircraft; and

2. On the manoeuvering area between aircraft and obstructions; and

b. Expediting and maintaining an orderly flow of air traffic.

AIR TRAFFIC CONTROL SPECIALIST- A person authorized to provide air traffic control service.

(See AIR TRAFFIC CONTROL.)

(See FLIGHT SERVICE STATION.)

(See ICAO term CONTROLLER.)

AIR TRAFFIC CONTROL SYSTEM COMMAND CENTER- An Air Traffic Tactical Operations facility consisting of four operational units.

a. Central Flow Control Function (CFCF). Responsible for coordination and approval of all major intercenter flow control restrictions on a system basis in order to obtain maximum utilization of the airspace.

(See QUOTA FLOW CONTROL.)

b. Central Altitude Reservation Function (CARF). Responsible for coordinating, planning, and approving special user requirements under the Altitude Reservation (ALTRV) concept.

(See ALTITUDE RESERVATION.)

c. Airport Reservation Office (ARO). Responsible for approving IFR flights at designated high density traffic airports (John F. Kennedy, LaGuardia, O'Hare, and Washington National) during specified hours.

(Refer to FAR Part 93.)

(Refer to AIRPORT/FACILITY DIRECTORY.)

d. ATC Contingency Command Post. A facility which enables the FAA to manage the ATC system when significant portions of the system's capabilities have been lost or are threatened.

AIR TRAFFIC SERVICE- A generic term meaning:

a. Flight Information Service:

b. Alerting Service:

c. Air Traffic Advisory Service:

d. Air Traffic Control Service:

1. Area Control Service,

2. Approach Control Service, or

3. Airport Control Service.

AIRWAY- A Class E airspace area established in the form of a corridor, the centerline of which is defined by radio navigational aids.

(See FEDERAL AIRWAYS.)

(Refer to FAR Part 71.)

(Refer to AIM.)

(See ICAO term AIRWAY.)

AIRWAY [ICAO]- A control area or portion thereof established in the form of corridor equipped with radio navigational aids.

AIRWAY BEACON- Used to mark airway segments in remote mountain areas. The light flashes Morse Code to identify the beacon site.

(Refer to AIM.)

AIT-

(See AUTOMATED INFORMATION TRANSFER.)

ALERFA (Alert Phase) [ICAO]- A situation wherein apprehension exists as to the safety of an aircraft and its occupants.

ALERT AREA-

(See SPECIAL USE AIRSPACE.)

ALERT NOTICE- A request originated by a flight service station (FSS) or an air route traffic control center (ARTCC) for an extensive communication search for overdue, unreported, or missing aircraft.

ALERTING SERVICE- A service provided to notify appropriate organizations regarding aircraft in need of search and rescue aid and assist such organizations as required.

ALNOT- (See ALERT NOTICE.)

ALONG TRACK DISTANCE (LTD) - The distance measured from a point-in-space by systems using area navigation reference capabilities that are not subject to slant range errors.

ALPHANUMERIC DISPLAY- Letters and numerals used to show identification, altitude, beacon code, and other information concerning a target on a radar display.

(See AUTOMATED RADAR TERMINAL SYSTEMS.)

(See NAS STAGE A.)

ALTERNATE AERODROME [ICAO]- An aerodrome to which an aircraft may proceed when it becomes either impossible or inadvisable to proceed to or to land at the aerodrome of intended landing.

Note: The aerodrome from which a flight departs may also be an en-route or a destination alternate aerodrome for the flight.

ALTERNATE AIRPORT- An airport at which an aircraft may land if a landing at the intended airport becomes inadvisable.

(See ICAO term ALTERNATE AERODROME.)

ALTIMETER SETTING- The barometric pressure reading used to adjust a pressure altimeter for variations in existing atmospheric pressure or to the standard altimeter setting (29.92.)

(Refer to FAR Part 91.)

(Refer to AIM.)

ALTITUDE- The height of a level, point, or object measured in feet Above Ground Level (AGL) or from Mean Sea Level (MSL.)

(See FLIGHT LEVEL.)

a. MSL Altitude- Altitude expressed in feet measured from mean sea level.

b. AGL Altitude- Altitude expressed in feet measured above ground level.

c. Indicated Altitude- The altitude as shown by an altimeter. On a pressure or barometric altimeter it is altitude as shown uncorrected for instrument error and uncompensated for variation from standard atmospheric conditions.

(See ICAO term ALTITUDE.)

ALTITUDE [ICAO]- The vertical distance of a level, a point or an object considered as a point, measured from mean sea level (MSL.)

ALTITUDE READOUT- An aircraft's altitude, transmitted via the Mode C transponder feature, that is visually displayed in 100-foot increments on a radar scope having readout capability.

(See AUTOMATED RADAR TERMINAL SYSTEMS.)

(See NAS STAGE A.)

(See ALPHANUMERIC DISPLAY.)

(Refer to AIM.)

ALTITUDE RESERVATION- Airspace utilization under prescribed conditions normally employed for the mass movement of aircraft or other special user requirements which cannot otherwise be accomplished. ALTRV's are approved by the appropriate FAA facility.

(See AIR TRAFFIC CONTROL SYSTEM COMMAND CENTER.)

ALTITUDE RESTRICTION- An altitude or altitudes, stated in the order flown, which are to be maintained until reaching a specific point or time. Altitude restrictions may be issued by ATC due to traffic, terrain, or other airspace considerations.

ALTITUDE RESTRICTIONS ARE CANCELED- Adherence to previously imposed altitude restrictions is no longer required during a climb or descent.

ALTRV-

(See ALTITUDE RESERVATION.)

AMASS-

(See AIRPORT MOVEMENT AREA SAFETY SYSTEM.)

AMVER-

(See AUTOMATED MUTUAL-ASSISTANCE VESSEL RESCUE SYSTEM.)

APPROACH CLEARANCE- Authorization by ATC for a pilot to conduct an instrument approach. The type of instrument approach for which a clearance and other pertinent information is provided in the approach clearance when required.

(See INSTRUMENT APPROACH PROCEDURE.)

(See CLEARED APPROACH.)

(Refer to AIM and FAR Part 91.)

APPROACH CONTROL FACILITY- A terminal ATC facility that provides approach control service in a terminal area.

(See APPROACH CONTROL SERVICE.)

(See RADAR APPROACH CONTROL FACILITY.)

APPROACH CONTROL SERVICE- Air traffic control service provided by an approach control facility for arriving and departing VFR/IFR aircraft and, on occasion, en route aircraft. At some airports not served by an approach control facility, the ARTCC provides limited approach control service.

(Refer to AIM.)

(See ICAO term APPROACH CONTROL SERVICE.)

APPROACH CONTROL SERVICE [ICAO]- Air traffic control service for arriving or departing controlled flights.

APPROACH GATE- An imaginary point used within ATC as a basis for vectoring aircraft to the final approach course. The gate will be established along the final approach course 1 mile from the final approach fix on the side away from the airport and will be no closer than 5 miles from the landing threshold.

APPROACH LIGHT SYSTEM-

(See AIRPORT LIGHTING.)

APPROACH SEQUENCE- The order in which aircraft are positioned while on approach or awaiting approach clearance.

(See LANDING SEQUENCE.)

(See ICAO term APPROACH SEQUENCE.)

APPROACH SEQUENCE [ICAO]- The order in which two or more aircraft are cleared to approach to land at the aerodrome.

APPROACH SPEED- The recommended speed contained in aircraft manuals used by pilots when making an approach to landing. This speed will vary for different segments of an approach as well as for aircraft weight and configuration.

APPROPRIATE ATS AUTHORITY [ICAO]- The relevant authority designated by the State responsible for providing air traffic services in the airspace concerned. In the United States, the "appropriate ATS authority" is the Program Director for Air Traffic Planning and Procedures, ATP-1.

APPROPRIATE AUTHORITY-

a. Regarding flight over the high seas: the relevant authority is the State of Registry.

b. Regarding flight over other than the high seas: the relevant authority is the State having sovereignty over the territory being overflown.

APPROPRIATE OBSTACLE CLEARANCE MINIMUM ALTITUDE- Any of the following:

(See Minimum IFR Altitude- MIA.)

(See Minimum En Route Altitude- MEA.)

(See Minimum Obstruction Clearance Altitude- MOCA.)

(See Minimum Vectoring Altitude- MVA.)

APPROPRIATE TERRAIN CLEARANCE MINIMUM ALTITUDE- Any of the following:

(See Minimum IFR Altitude- MIA.)

(See Minimum En Route Altitude- MEA.)

(See Minimum Obstruction Clearance Altitude- MOCA.)

(See Minimum Vectoring Altitude- MVA.)

APRON- A defined area on an airport or heliport intended to accommodate aircraft for purposes of loading or unloading passengers or cargo, refueling, parking, or maintenance. With regard to seaplanes, a ramp is used for access to the apron from the water.

(See ICAO term APRON.)

APRON [ICAO]- A defined area, on a land aerodrome, intended to accommodate aircraft for purposes of loading or unloading passengers, mail or cargo, refueling, parking or maintenance.

ARC- The track over the ground of an aircraft flying at a constant distance from a navigational aid by reference to distance measuring equipment (DME).

AREA CONTROL CENTER [ICAO]- An ICAO term for an air traffic control facility primarily responsible for ATC services being provided IFR aircraft during the en route phase of flight. The U.S. equivalent facility is an air route traffic control center (ARTCC).

AREA NAVIGATION- Area Navigation (RNAV) provides enhanced navigational capability to the pilot. RNAV equipment can compute the airplane position, actual track and ground speed and then provide meaningful information relative to a route of flight selected by the pilot. Typical equipment will provide the pilot with distance, time, bearing and crosstrack error relative to the selected "TO" or "active" waypoint and the selected route. Several distinctly different navigational systems with different navigational performance characteristics are capable of providing area navigational functions. Present day RNAV includes INS, LORAN, VOR/DME, and GPS systems. Modern multi-sensor systems can integrate one or more of the above systems to provide a more accurate and reliable navigational system. Due to the different levels of performance, area navigational capabilities can satisfy different levels of required navigational performance (RNP). The major types of equipment are:

a. VORTAC referenced or Course Line Computer (CLC) systems, which account for the greatest number of RNAV units in use. To function, the CLC must be within the service range of a VORTAC.

b. OMEGA/VLF, although two separate systems, can be considered as one operationally. A long-range navigation system based upon Very Low Frequency radio signals transmitted from a total of 17 stations worldwide.

c. Inertial (INS) systems, which are totally self-contained and require no information from external references. They provide aircraft position and navigation information in response to signals resulting from inertial effects on components within the system.

d. MLS Area Navigation (MLS/RNAV), which provides area navigation with reference to an MLS ground facility.

e. LORAN-C is a long-range radio navigation system that uses ground waves transmitted at low frequency to provide user position information at ranges of up to 600

to 1,200 nautical miles at both en route and approach altitudes. The usable signal coverage areas are determined by the signal-to-noise ratio, the envelope-to-cycle difference, and the geometric relationship between the positions of the user and the transmitting stations.

f. GPS-is a space-base radio positioning, navigation, and time-transfer system. The system provides highly accurate position and velocity information, and precise time, on a continuous global basis, to an unlimited number of properly equipped users. The system is unaffected by weather, and provides a worldwide common grid reference system.

(See ICAO term AREA NAVIGATION.)

AREA NAVIGATION [ICAO]- A method of navigation which permits aircraft operation on any desired flight path within the coverage of station-referenced navigation aids or within the limits of the capability of self-contained aids, or a combination of these.

AREA NAVIGATION (RNAV) APPROACH CONFIGURATION:

a. STANDARD T- An RNAV approach whose design allows direct flight to any one of three initial approach fixes (IAF) and eliminates the need for procedure turns. The standard design is to align the procedure on the extended centerline with the missed approach point (MAP) at the runway threshold, the final approach fix (FAF), and the initial approach/intermediate fix (IAF/IF). The other two IAF's will be established perpendicular to the IF.

b. MODIFIED T- An RNAV approach design for single or multiple runways where terrain or operational constraints do not allow for the standard T. The "T" may be modified by increasing or decreasing the angle from the corner IAF(s) to the IF or by eliminating one or both corner IAF's.

c. STANDARD I- An RNAV approach design for a single runway with both corner IAF's eliminated. Course reversal or radar vectoring may be required at busy terminals with multiple runways.

d. TERMINAL ARRIVAL AREA (TAA)- The TAA is controlled airspace established in conjunction with the Standard or Modified T and I RNAV approach configurations. In the standard TAA, there are three areas: straight-in, left base, and right base. The arc boundaries of the three areas of the TAA are published portions of the approach and allow aircraft to transition from the en route structure direct to the nearest IAF. TAA's will also eliminate or reduce feeder routes, departure extensions, and procedure turns or course reversal.

1. STRAIGHT-IN AREA- A 30NM arc centered on the IF bounded by a straight line extending through the IF perpendicular to the intermediate course.

2. LEFT BASE AREA- A 30NM arc centered on the right corner IAF. The area shares a boundary with the straight-in area except that it extends out for 30NM from the IAF and is bounded on the other side by a line extending from the IF through the FAF to the arc.

3. RIGHT BASE AREA- A 30NM arc centered on the left corner IAF. The area shares a boundary with the straight-in area except that it extends out for 30NM from the IAF and is bounded on the other side by a line extending from the IF through the FAF to the arc.

ARINC- An acronym for Aeronautical Radio, Inc., a corporation largely owned by a group of airlines. ARINC is licensed by the FCC as an aeronautical station and contracted by the FAA to provide communications support for air traffic control and meteorological services in portions of international airspace.

ARMY AVIATION FLIGHT INFORMATION BULLETIN- A bulletin that provides air operation data covering Army, National Guard, and Army Reserve aviation activities.

ARO-

(See AIRPORT RESERVATION OFFICE.)

ARRESTING SYSTEM- A safety device consisting of two major components, namely, engaging or catching devices and energy absorption devices for the purpose of arresting both tailhook and/or nontailhook-equipped aircraft. It is used to prevent aircraft from overrunning runways when the aircraft cannot be stopped after landing or during aborted takeoff. Arresting systems have various names; e.g., arresting gear, hook device, wire barrier cable.

(See ABORT.)

(Refer to AIM.)

ARRIVAL AIRCRAFT INTERVAL- An internally generated program in hundredths of minutes based

upon the AAR. AAI is the desired optimum interval between successive arrival aircraft over the vertex.

ARRIVAL CENTER- The ARTCC having jurisdiction for the impacted airport.

ARRIVAL DELAY- A parameter which specifies a period of time in which no aircraft will be metered for arrival at the specified airport.

ARRIVAL SECTOR- An operational control sector containing one or more meter fixes.

ARRIVAL SECTOR ADVISORY LIST- An ordered list of data on arrivals displayed at the PVD/MDM of the sector which controls the meter fix.

ARRIVAL SEQUENCING PROGRAM- The automated program designed to assist in sequencing aircraft destined for the same airport.

ARRIVAL TIME- The time an aircraft touches down on arrival.

ARSR-
(See AIR ROUTE SURVEILLANCE RADAR.)

ARTCC-
(See AIR ROUTE TRAFFIC CONTROL CENTER.)

ARTS-
(See AUTOMATED RADAR TERMINAL SYSTEMS.)

ASDA-
(See ACCELERATE-STOP DISTANCE AVAILABLE.)

ASDA [ICAO]-
(See ICAO Term ACCELERATE-STOP DISTANCE AVAILABLE.)

ASDE-
(See AIRPORT SURFACE DETECTION EQUIPMENT.)

ASLAR-
(See AIRCRAFT SURGE LAUNCH AND RECOVERY.)

ASP-
(See ARRIVAL SEQUENCING PROGRAM.)

ASR-
(See AIRPORT SURVEILLANCE RADAR.)

ASR APPROACH-
(See SURVEILLANCE APPROACH.)

ATC-
(See AIR TRAFFIC CONTROL.)

ATCAA-
(See ATC ASSIGNED AIRSPACE.)

ATC ADVISES- Used to prefix a message of noncontrol information when it is relayed to an aircraft by other than an air traffic controller.
(See ADVISORY.)

ATC ASSIGNED AIRSPACE- Airspace of defined vertical/lateral limits, assigned by ATC, for the purpose of providing air traffic segregation between the specified activities being conducted within the assigned airspace and other IFR air traffic.
(See SPECIAL USE AIRSPACE.)

ATC CLEARANCE-
(See AIR TRAFFIC CLEARANCE.)

ATC CLEARS- Used to prefix an ATC clearance when it is relayed to an aircraft by other than an air traffic controller.

ATC INSTRUCTIONS- Directives issued by air traffic control for the purpose of requiring a pilot to take specific actions; e.g., "Turn left heading two five zero," "Go around," "Clear the runway."
(Refer to FAR Part 91.)

ATCRBS-
(See RADAR.)

ATC REQUESTS- Used to prefix an ATC request when it is relayed to an aircraft by other than an air traffic controller.

ATCSCC-
(See AIR TRAFFIC CONTROL SYSTEM COMMAND CENTER.)

ATCSCC DELAY FACTOR- The amount of delay calculated to be assigned prior to departure.

ATCT-
(See TOWER.)

ATIS-
(See AUTOMATIC TERMINAL INFORMATION SERVICE.)

ATIS [ICAO]-
(See ICAO Term AUTOMATIC TERMINAL INFORMATION SERVICE.)

ATS Route [ICAO]- A specified route designed for channelling the flow of traffic as necessary for the provision of air traffic services.
Note: The term "ATS Route" is used to mean variously, airway, advisory route, controlled or uncontrolled route, arrival or departure, etc.

ATTS-
(See AUTOMATED TERMINAL TRACKING SYSTEM.)

AUTOLAND APPROACH- An autoland approach is a precision instrument approach to touchdown and, in

some cases, through the landing rollout. An autoland approach is performed by the aircraft autopilot which is receiving position information and/or steering commands from onboard navigation equipment.

(See COUPLED APPROACH.)

Note: Autoland and coupled approaches are flown in VFR and IFR. It is common for carriers to require their crews to fly coupled approaches and autoland approaches (if certified) when the weather conditions are less than approximately 4,000 RVR.

AUTOMATED INFORMATION TRANSFER- A pre-coordinated process, specifically defined in facility directives, during which a transfer of altitude control and/or radar identification is accomplished without verbal coordination between controllers using information communicated in a full data block.

AUTOMATED MUTUAL-ASSISTANCE VESSEL RESCUE SYSTEM- A facility which can deliver, in a matter of minutes, a surface picture (SURPIC) of vessels in the area of a potential or actual search and rescue incident, including their predicted positions and their characteristics.

(See FAAO 7110.65, Para 10-6-4, INFLIGHT CONTINGENCIES.)

AUTOMATED RADAR TERMINAL SYSTEMS- The generic term for the ultimate in functional capability afforded by several automation systems. Each differs in functional capabilities and equipment. ARTS plus a suffix roman numeral denotes a specific system. A following letter indicates a major modification to that system. In general, an ARTS displays for the terminal controller aircraft identification, flight plan data, other flight associated information; e.g., altitude, speed, and aircraft position symbols in conjunction with his radar presentation. Normal radar co-exists with the alphanumeric display. In addition to enhancing visualization of the air traffic situation, ARTS facilitate intra/inter-facility transfer and coordination of flight information. These capabilities are enabled by specially designed computers and subsystems tailored to the radar and communications equipments and operational requirements of each automated facility. Modular design permits adoption of improvements in computer software and electronic technologies as they become available while retaining the characteristics unique to each system.

a. ARTS II. A programmable nontracking, computer-aided display subsystem capable of modular expansion. ARTS II systems provide a level of automated air traffic control capability at terminals having low to medium activity. Flight identification and altitude may be associated with the display of secondary radar targets. The system has the capability of communicating with ARTCC's and other ARTS II, IIA, III, and IIIA facilities.

b. ARTS IIA. A programmable radar-tracking computer subsystem capable of modular expansion. The ARTS IIA detects, tracks, and predicts secondary radar targets. The targets are displayed by means of computer-generated symbols, ground speed, and flight plan data. Although it does not track primary radar targets, they are displayed coincident with the secondary radar as well as the symbols and alphanumerics. The system has the capability of communicating with ARTCC's and other ARTS II, IIA, III, and IIIA facilities.

c. ARTS III. The Beacon Tracking Level of the modular programmable automated radar terminal system in use at medium to high activity terminals. ARTS III detects, tracks, and predicts secondary radar-derived aircraft targets. These are displayed by means of computer-generated symbols and alphanumeric characters depicting flight identification, aircraft altitude, ground speed, and flight plan data. Although it does not track primary targets, they are displayed coincident with the secondary radar as well as the symbols and alphanumerics. The system has the capability of communicating with ARTCC's and other ARTS III facilities.

d. ARTS IIIA. The Radar Tracking and Beacon Tracking Level (RT&BTL) of the modular, programmable automated radar terminal system. ARTS IIIA detects, tracks, and predicts primary as well as secondary radar-derived aircraft targets. This more sophisticated computer-driven system upgrades the existing ARTS III system by providing improved tracking, continuous data recording, and fail-soft capabilities.

AUTOMATED TERMINAL TRACKING SYSTEM (ATTS)- ATTS is used to identify the numerous tracking systems including ARTS IIA, ARTS IIE, ARTS IIIA, ARTS IIIE, STARS, and M-EARTS.

AUTOMATIC ALTITUDE REPORT-

(See ALTITUDE READOUT.)

AUTOMATIC ALTITUDE REPORTING- That function of a transponder which responds to Mode C interrogations by transmitting the aircraft's altitude in 100-foot increments.

AUTOMATIC CARRIER LANDING SYSTEM- U.S. Navy final approach equipment consisting of precision tracking radar coupled to a computer data link to

provide continuous information to the aircraft, monitoring capability to the pilot, and a backup approach system.

AUTOMATIC DIRECTION FINDER- An aircraft radio navigation system which senses and indicates the direction to a L/MF nondirectional radio beacon (NDB) ground transmitter. Direction is indicated to the pilot as a magnetic bearing or as a relative bearing to the longitudinal axis of the aircraft depending on the type of indicator installed in the aircraft. In certain applications, such as military, ADF operations may be based on airborne and ground transmitters in the VHF/UHF frequency spectrum.

(See BEARING.)

(See NONDIRECTIONAL BEACON.)

AUTOMATIC TERMINAL INFORMATION SERVICE- The continuous broadcast of recorded noncontrol information in selected terminal areas. Its purpose is to improve controller effectiveness and to relieve frequency congestion by automating the repetitive transmission of essential but routine information; e.g., "Los Angeles information Alfa. One three zero zero Coordinated Universal Time. Weather, measured ceiling two thousand overcast, visibility three, haze, smoke, temperature seven one, dew point five seven, wind two five zero at five, altimeter two niner niner six. I-L-S Runway Two Five Left approach in use, Runway Two Five Right closed, advise you have Alfa."

(Refer to AIM.)

(See ICAO term AUTOMATIC TERMINAL INFORMATION SERVICE.)

AUTOMATIC TERMINAL INFORMATION SERVICE [ICAO]- The provision of current, routine information to arriving and departing aircraft by means of continuous and repetitive broadcasts throughout the day or a specified portion of the day.

AUTOROTATION- A rotorcraft flight condition in which the lifting rotor is driven entirely by action of the air when the rotorcraft is in motion.

a. Autorotative Landing/Touchdown Autorotation. Used by a pilot to indicate that the landing will be made without applying power to the rotor.

b. Low Level Autorotation. Commences at an altitude well below the traffic pattern, usually below 100 feet AGL and is used primarily for tactical military training.

c. 180 degrees Autorotation. Initiated from a downwind heading and is commenced well inside the normal traffic pattern. "Go around" may not be possible during the latter part of this maneuver.

AVAILABLE LANDING DISTANCE (ALD)- The portion of a runway available for landing and roll-out for aircraft cleared for LAHSO. This distance is measured from the landing threshold to the hold-short point.

AVIATION WEATHER SERVICE- A service provided by the National Weather Service (NWS) and FAA which collects and disseminates pertinent weather information for pilots, aircraft operators, and ATC. Available aviation weather reports and forecasts are displayed at each NWS office and FAA FSS.

(See EN ROUTE FLIGHT ADVISORY SERVICE.)

(See TRANSCRIBED WEATHER BROADCAST.)

(See WEATHER ADVISORY.)

(Refer to AIM.)

AWW-

(See SEVERE WEATHER FORECAST ALERTS.)

AZIMUTH (MLS)- A magnetic bearing extending from an MLS navigation facility.

Note: azimuth bearings are described as magnetic and are referred to as "azimuth" in radio telephone communications.

C

CALCULATED LANDING TIME- A term that may be used in place of tentative or actual calculated landing time, whichever applies.

CALL UP- Initial voice contact between a facility and an aircraft, using the identification of the unit being called and the unit initiating the call.
(Refer to AIM.)

CALL FOR RELEASE- Wherein the overlying ARTCC requires a terminal facility to initiate verbal coordination to secure ARTCC approval for release of a departure into the en route environment.

CANADIAN MINIMUM NAVIGATION PERFORMANCE SPECIFICATION AIRSPACE- That portion of Canadian domestic airspace within which MNPS separation may be applied.

CARDINAL ALTITUDES- "Odd" or "Even" thousand-foot altitudes or flight levels; e.g., 5,000, 6,000, 7,000, FL 250, FL 260, FL 270.
(See ALTITUDE.)
(See FLIGHT LEVEL.)

CARDINAL FLIGHT LEVELS-
(See CARDINAL ALTITUDES.)

CAT-
(See CLEAR-AIR TURBULENCE.)

CDT PROGRAMS-
(See CONTROLLED DEPARTURE TIME PROGRAMS.)

CEILING- The heights above the earth's surface of the lowest layer of clouds or obscuring phenomena that is reported as "broken," "overcast," or "obscuration," and not classified as "thin" or "partial."
(See ICAO term CEILING.)

CEILING [ICAO]- The height above the ground or water of the base of the lowest layer of cloud below 6,000 meters (20,000 feet) covering more than half the sky.

CENRAP-
(See CENTER RADAR ARTS PRESENTATION/PROCESSING.)

CENRAP-PLUS-
(See CENTER RADAR ARTS PRESENTATION/PROCESSING-PLUS.)

CENTER-
(See AIR ROUTE TRAFFIC CONTROL CENTER.)

CENTER'S AREA- The specified airspace within which an air route traffic control center (ARTCC) provides air traffic control and advisory service.
(See AIR ROUTE TRAFFIC CONTROL CENTER.)
(Refer to AIM.)

CENTER RADAR ARTS PRESENTATION/PROCESSING- A computer program developed to provide a back-up system for airport surveillance radar in the event of a failure or malfunction. The program uses air route traffic control center radar for the processing and presentation of data on the ARTS IIA or IIIA displays.

CENTER RADAR ARTS PRESENTATION/PROCESSING-PLUS- A computer program developed to provide a back-up system for airport surveillance radar in the event of a terminal secondary radar system failure. The program uses a combination of Air Route Traffic Control Center Radar and terminal airport surveillance radar primary targets displayed simultaneously for the processing and presentation of data on the ARTS IIA or IIIA displays.

CENTER WEATHER ADVISORY- An unscheduled weather advisory issued by Center Weather Service Unit meteorologists for ATC use to alert pilots of existing or anticipated adverse weather conditions within the next 2 hours. A CWA may modify or redefine a SIGMET.
(See AWW.)
(See SIGMET.)
(See CONVECTIVE SIGMET.)
(See AIRMET.)
(Refer to AIM.)

CENTRAL EAST PACIFIC- An organized route system between the U.S. West Coast and Hawaii.

CEP-
(See CENTRAL EAST PACIFIC.)

CERAP-
(See COMBINED CENTER-RAPCON.)

CERTIFIED TOWER RADAR DISPLAY (CTRD)- A radar display that provides a presentation of primary, beacon radar videos, and alphanumeric data from an Air Traffic Control radar system, which is certified by the FAA to provide radar services. Examples include Digital Bright Radar Indicator Tower Equipment

(DBRITE), Tower Display Workstation (TDW) and BRITE.

CFR-
(See CALL FOR RELEASE.)

CHAFF- Thin, narrow metallic reflectors of various lengths and frequency responses, used to reflect radar energy. These reflectors when dropped from aircraft and allowed to drift downward result in large targets on the radar display.

CHARTED VFR FLYWAYS- Charted VFR Flyways are flight paths recommended for use to bypass areas heavily traversed by large turbine-powered aircraft. Pilot compliance with recommended flyways and associated altitudes is strictly voluntary. VFR Flyway Planning charts are published on the back of existing VFR Terminal Area charts.

CHARTED VISUAL FLIGHT PROCEDURE APPROACH- An approach conducted while operating on an instrument flight rules (IFR) flight plan which authorizes the pilot of an aircraft to proceed visually and clear of clouds to the airport via visual landmarks and other information depicted on a charted visual flight procedure. This approach must be authorized and under the control of the appropriate air traffic control facility. Weather minimums required are depicted on the chart.

CHASE- An aircraft flown in proximity to another aircraft normally to observe its performance during training or testing.

CHASE AIRCRAFT-
(See CHASE.)

CIRCLE-TO-LAND MANEUVER- A maneuver initiated by the pilot to align the aircraft with a runway for landing when a straight-in landing from an instrument approach is not possible or is not desirable. At tower controlled airports, this maneuver is made only after ATC authorization has been obtained and the pilot has established required visual reference to the airport.
(See CIRCLE TO RUNWAY.)
(See LANDING MINIMUMS.)
(Refer to AIM.)

CIRCLE TO RUNWAY (RUNWAY NUMBER)- Used by ATC to inform the pilot that he must circle to land because the runway in use is other than the runway aligned with the instrument approach procedure. When the direction of the circling maneuver in relation to the airport/runway is required, the controller will state the direction (eight cardinal compass points) and specify a left or right downwind or base leg as appropriate; e.g., "Cleared VOR Runway Three Six Approach circle to Runway Two Two," or "Circle northwest of the airport for a right downwind to Runway Two Two."
(See CIRCLE-TO-LAND MANEUVER.)
(See LANDING MINIMUMS.)
(Refer to AIM.)

CIRCLING APPROACH-
(See CIRCLE-TO-LAND MANEUVER.)

CIRCLING MANEUVER-
(See CIRCLE-TO-LAND MANEUVER.)

CIRCLING MINIMA-
(See LANDING MINIMUMS.)

CLASS A AIRSPACE-
(See CONTROLLED AIRSPACE)

CLASS B AIRSPACE-
(See CONTROLLED AIRSPACE)

CLASS C AIRSPACE-
(See CONTROLLED AIRSPACE)

CLASS D AIRSPACE-
(See CONTROLLED AIRSPACE)

CLASS E AIRSPACE-
(See CONTROLLED AIRSPACE)

CLASS G AIRSPACE- That airspace not designated as Class A, B, C, D or E.

CLEAR-AIR TURBULENCE- Turbulence encountered in air where no clouds are present. This term is commonly applied to high-level turbulence associated with wind shear. CAT is often encountered in the vicinity of the jet stream.
(See WIND SHEAR.)
(See JET STREAM.)

CLEAR OF THE RUNWAY-

a. A taxiing aircraft, which is approaching a runway, is clear of the runway when all parts of the aircraft are held short of the applicable holding position marking.

b. A pilot or controller may consider an aircraft, which is exiting or crossing a runway, to be clear of the runway when all parts of the aircraft are beyond the runway edge and there is no ATC restriction to its continued movement beyond the applicable holding position marking.

c. Pilots and controllers shall exercise good judgement to ensure that adequate separation exists between all aircraft on runways and taxiways at airports with inadequate runway edge lines or holding position markings.

CLEARANCE-
(See AIR TRAFFIC CLEARANCE.)

CLEARANCE LIMIT- The fix, point, or location to which an aircraft is cleared when issued an air traffic clearance.

(See ICAO term CLEARANCE LIMIT.)

CLEARANCE LIMIT [ICAO]- The point of which an aircraft is granted an air traffic control clearance.

CLEARANCE VOID IF NOT OFF BY (TIME)- Used by ATC to advise an aircraft that the departure clearance is automatically canceled if takeoff is not made prior to a specified time. The pilot must obtain a new clearance or cancel his IFR flight plan if not off by the specified time.

(See ICAO term CLEARANCE VOID TIME.)

CLEARANCE VOID TIME [ICAO]- A time specified by an air traffic control unit at which a clearance ceases to be valid unless the aircraft concerned has already taken action to comply therewith.

CLEARED AS FILED- Means the aircraft is cleared to proceed in accordance with the route of flight filed in the flight plan. This clearance does not include the altitude, DP, or DP Transition.

(See REQUEST FULL ROUTE CLEARANCE.)

(Refer to AIM.)

CLEARED (Type Of) APPROACH- ATC authorization for an aircraft to execute a specific instrument approach procedure to an airport; e.g., "Cleared ILS Runway Three Six Approach."

(See INSTRUMENT APPROACH PROCEDURE.)

(See APPROACH CLEARANCE.)

(Refer to AIM.)

(Refer to FAR Part 91.)

CLEARED APPROACH- ATC authorization for an aircraft to execute any standard or special instrument approach procedure for that airport. Normally, an aircraft will be cleared for a specific instrument approach procedure.

(See INSTRUMENT APPROACH PROCEDURE.)

(See CLEARED (TYPE OF) APPROACH.)

(Refer to AIM.)

(Refer to Part 91.)

CLEARED FOR TAKEOFF- ATC authorization for an aircraft to depart. It is predicated on known traffic and known physical airport conditions.

CLEARED FOR THE OPTION- ATC authorization for an aircraft to make a touch-and-go, low approach, missed approach, stop and go, or full stop landing at the discretion of the pilot. It is normally used in training so that an instructor can evaluate a student's performance under changing situations.

(See OPTION APPROACH.)

(Refer to AIM.)

CLEARED THROUGH- ATC authorization for an aircraft to make intermediate stops at specified airports without refiling a flight plan while en route to the clearance limit.

CLEARED TO LAND- ATC authorization for an aircraft to land. It is predicated on known traffic and known physical airport conditions.

CLEARWAY- An area beyond the takeoff runway under the control of airport authorities within which terrain or fixed obstacles may not extend above specified limits. These areas may be required for certain turbine-powered operations and the size and upward slope of the clearway will differ depending on when the aircraft was certificated.

(Refer to FAR Part 1.)

CLIMBOUT- That portion of flight operation between takeoff and the initial cruising altitude.

CLIMB TO VFR- ATC authorization for an aircraft to climb to VFR conditions within Class B, C, D, and E surface areas when the only weather limitation is restricted visibility. The aircraft must remain clear of clouds while climbing to VFR.

(See SPECIAL VFR.)

(Refer to AIM.)

CLOUD- A cloud is a visible accumulation of minute water droplets and/or ice particles in the atmosphere above the Earth's surface. Cloud differs from ground fog, fog, or ice fog only in that the latter are, by definition, in contact with the Earth's surface.

CLOSE PARALLEL RUNWAYS- Two parallel runways whose extended centerlines are separated by less than 4,300 feet, having a Precision Runway Monitoring (PRM) system that permits simultaneous independent ILS approaches.

CLOSED RUNWAY- A runway that is unusable for aircraft operations. Only the airport management/military operations office can close a runway.

CLOSED TRAFFIC- Successive operations involving takeoffs and landings or low approaches where the aircraft does not exit the traffic pattern.

CLT-

(See CALCULATED LANDING TIME.)

CLUTTER- In radar operations, clutter refers to the reception and visual display of radar returns caused by

precipitation, chaff, terrain, numerous aircraft targets, or other phenomena. Such returns may limit or preclude ATC from providing services based on radar.

(See GROUND CLUTTER.)

(See CHAFF.)

(See PRECIPITATION.)

(See TARGET.)

(See ICAO term Radar Clutter.)

CMNPS-

(See CANADIAN MINIMUM NAVIGATION PERFORMANCE SPECIFICATION AIRSPACE.)

COASTAL FIX- A navigation aid or intersection where an aircraft transitions between the domestic route structure and the oceanic route structure.

CODES- The number assigned to a particular multiple pulse reply signal transmitted by a transponder.

(See DISCRETE CODE.)

COMBINED CENTER-RAPCON- An air traffic facility which combines the functions of an ARTCC and a radar approach control facility.

(See AIR ROUTE TRAFFIC CONTROL CENTER.)

(See RADAR APPROACH CONTROL FACILITY.)

COMMON POINT- A significant point over which two or more aircraft will report passing or have reported passing before proceeding on the same or diverging tracks. To establish/maintain longitudinal separation, a controller may determine a common point not originally in the aircraft's flight plan and then clear the aircraft to fly over the point.

(See SIGNIFICANT POINT.)

COMMON PORTION-

(See COMMON ROUTE.)

COMMON ROUTE- That segment of a North American Route between the inland navigation facility and the coastal fix.

COMMON TRAFFIC ADVISORY FREQUENCY (CTAF)- A frequency designed for the purpose of carrying out airport advisory practices while operating to or from an airport without an operating control tower. The CTAF may be a UNICOM, Multicom, FSS, or tower frequency and is identified in appropriate aeronautical publications.

(Refer to AC 90-42, Traffic Advisory Practices at Airports Without Operating Control Towers.)

COMPASS LOCATOR- A low power, low or medium frequency (L/MF) radio beacon installed at the site of the outer or middle marker of an instrument landing system (ILS). It can be used for navigation at distances of approximately 15 miles or as authorized in the approach procedure.

a. Outer Compass Locator (LOM)- A compass locator installed at the site of the outer marker of an instrument landing system.

(See OUTER MARKER.)

b. Middle Compass Locator (LMM)- A compass locator installed at the site of the middle marker of an instrument landing system.

(See MIDDLE MARKER.)

(See ICAO term LOCATOR.)

COMPASS ROSE- A circle, graduated in degrees, printed on some charts or marked on the ground at an airport. It is used as a reference to either true or magnetic direction.

COMPOSITE FLIGHT PLAN- A flight plan which specifies VFR operation for one portion of flight and IFR for another portion. It is used primarily in military operations.

(Refer to AIM.)

COMPOSITE ROUTE SYSTEM- An organized oceanic route structure, incorporating reduced lateral spacing between routes, in which composite separation is authorized.

COMPOSITE SEPARATION- A method of separating aircraft in a composite route system where, by management of route and altitude assignments, a combination of half the lateral minimum specified for the area concerned and half the vertical minimum is applied.

COMPULSORY REPORTING POINTS- Reporting points which must be reported to ATC. They are designated on aeronautical charts by solid triangles or filed in a flight plan as fixes selected to define direct routes. These points are geographical locations which are defined by navigation aids/fixes. Pilots should discontinue position reporting over compulsory reporting points when informed by ATC that their aircraft is in "radar contact."

CONFLICT ALERT- A function of certain air traffic control automated systems designed to alert radar controllers to existing or pending situations between tracked targets (known IFR or VFR aircraft) that require his/her immediate attention/action.

(See MODE C INTRUDER ALERT.)

CONFLICT RESOLUTION- The resolution of potential conflictions between aircraft that are radar identified and in communication with ATC by ensuring that

latitude and longitude, used to determine position or location.

COORDINATION FIX- The fix in relation to which facilities will handoff, transfer control of an aircraft, or coordinate flight progress data. For terminal facilities, it may also serve as a clearance for arriving aircraft.

COPTER- (See HELICOPTER.)

CORRECTION- An error has been made in the transmission and the correct version follows.

COUPLED APPROACH- A coupled approach is an instrument approach performed by the aircraft autopilot which is receiving position information and/or steering commands from onboard navigation equipment. In general, coupled nonprecision approaches must be discontinued and flown manually at altitudes lower than 50 feet below the minimum descent altitude, and coupled precision approaches must be flown manually below 50 feet AGL.

(See AUTOLAND APPROACH.)

Note: Coupled and autoland approaches are flown in VFR and IFR. It is common for carriers to require their crews to fly coupled approaches and autoland approaches (if certified) when the weather conditions are less than approximately 4,000 RVR.

COURSE-

a. The intended direction of flight in the horizontal plane measured in degrees from north.

b. The ILS localizer signal pattern usually specified as the front course or the back course.

c. The intended track along a straight, curved, or segmented MLS path.

(See BEARING.)

(See RADIAL.)

(See INSTRUMENT LANDING SYSTEM.)

(See MICROWAVE LANDING SYSTEM.)

CPL [ICAO]-

(See CURRENT FLIGHT PLAN)

CRITICAL ENGINE- The engine which, upon failure, would most adversely affect the performance or handling qualities of an aircraft.

CROSS (FIX) AT (ALTITUDE)- Used by ATC when a specific altitude restriction at a specified fix is required.

CROSS (FIX) AT OR ABOVE (ALTITUDE)- Used by ATC when an altitude restriction at a specified fix is required. It does not prohibit the aircraft from crossing the fix at a higher altitude than specified; however, the higher altitude may not be one that will violate a succeeding altitude restriction or altitude assignment.

(See ALTITUDE RESTRICTION.)

(Refer to AIM.)

CROSS (FIX) AT OR BELOW (ALTITUDE)- Used by ATC when a maximum crossing altitude at a specific fix is required. It does not prohibit the aircraft from crossing the fix at a lower altitude; however, it must be at or above the minimum IFR altitude.

(See MINIMUM IFR ALTITUDES.)

(See ALTITUDE RESTRICTION.)

(Refer to FAR Part 91.)

CROSSWIND-

a. When used concerning the traffic pattern, the word means "crosswind leg."

(See TRAFFIC PATTERN.)

b. When used concerning wind conditions, the word means a wind not parallel to the runway or the path of an aircraft.

(See CROSSWIND COMPONENT.)

CROSSWIND COMPONENT- The wind component measured in knots at 90 degrees to the longitudinal axis of the runway.

CRUISE- Used in an ATC clearance to authorize a pilot to conduct flight at any altitude from the minimum IFR altitude up to and including the altitude specified in the clearance. The pilot may level off at any intermediate altitude within this block of airspace. Climb/descent within the block is to be made at the discretion of the pilot. However, once the pilot starts descent and verbally reports leaving an altitude in the block, he may not return to that altitude without additional ATC clearance. Further, it is approval for the pilot to proceed to and make an approach at destination airport and can be used in conjunction with:

a. An airport clearance limit at locations with a standard/special instrument approach procedure. The FAR's require that if an instrument letdown to an airport is necessary, the pilot shall make the letdown in accordance with a standard/special instrument approach procedure for that airport, or

b. An airport clearance limit at locations that are within/below/outside controlled airspace and without a standard/special instrument approach procedure. Such a clearance is NOT AUTHORIZATION for the pilot to descend under IFR conditions below the applicable minimum IFR altitude nor does it imply that ATC is exercising control over aircraft in Class G airspace; however, it provides a means for the aircraft to proceed

to destination airport, descend, and land in accordance with applicable FAR's governing VFR flight operations. Also, this provides search and rescue protection until such time as the IFR flight plan is closed.

(See INSTRUMENT APPROACH PROCEDURE.)

CRUISING ALTITUDE- An altitude or flight level maintained during en route level flight. This is a constant altitude and should not be confused with a cruise clearance.

(See ALTITUDE.)

(See ICAO term CRUISING LEVEL.)

CRUISING LEVEL [ICAO]- A level maintained during a significant portion of a flight.

CRUISE CLIMB- A climb technique employed by aircraft, usually at a constant power setting, resulting in an increase of altitude as the aircraft weight decreases.

CRUISING LEVEL-

(See CRUISING ALTITUDE.)

CT MESSAGE- An EDCT time generated by the ATCSCC to regulate traffic at arrival airports. Normally, a CT message is automatically transferred from the Traffic Management System computer to the NAS en route computer and appears as an EDCT. In the event of a communication failure between the TMS and the NAS, the CT message can be manually entered by the TMC at the en route facility.

CTA-

(See CONTROLLED TIME OF ARRIVAL.)

(See CONTROL AREA [ICAO].)

CTAF-

(See COMMON TRAFFIC ADVISORY FREQUENCY.)

CTRD-

(See CERTIFIED TOWER RADAR DISPLAY.)

CURRENT FLIGHT PLAN [ICAO]- The flight plan, including changes, if any, brought about by subsequent clearances.

CVFP APPROACH-

(See CHARTED VISUAL FLIGHT PROCEDURE APPROACH.)

CWA-

(See CENTER WEATHER ADVISORY and WEATHER ADVISORY.)

DISCRETE FREQUENCY- A separate radio frequency for use in direct pilot-controller communications in air traffic control which reduces frequency congestion by controlling the number of aircraft operating on a particular frequency at one time. Discrete frequencies are normally designated for each control sector in en route/terminal ATC facilities. Discrete frequencies are listed in the Airport/Facility Directory and the DOD FLIP IFR En Route Supplement.

(See CONTROL SECTOR.)

DISPLACED THRESHOLD- A threshold that is located at a point on the runway other than the designated beginning of the runway.

(See THRESHOLD.)

(Refer to AIM.)

DISTANCE MEASURING EQUIPMENT- Equipment (airborne and ground) used to measure, in nautical miles, the slant range distance of an aircraft from the DME navigational aid.

(See TACAN.)

(See VORTAC.)

(See MICROWAVE LANDING SYSTEM.)

DISTRESS- A condition of being threatened by serious and/or imminent danger and of requiring immediate assistance.

DIVE BRAKES-

(See SPEED BRAKES.)

DIVERSE VECTOR AREA- In a radar environment, that area in which a prescribed departure route is not required as the only suitable route to avoid obstacles. The area in which random radar vectors below the MVA/MIA, established in accordance with the TERPS criteria for diverse departures, obstacles and terrain avoidance, may be issued to departing aircraft.

DME-

(See DISTANCE MEASURING EQUIPMENT.)

DME FIX- A geographical position determined by reference to a navigational aid which provides distance and azimuth information. It is defined by a specific distance in nautical miles and a radial, azimuth, or course (i.e., localizer) in degrees magnetic from that aid.

(See DISTANCE MEASURING EQUIPMENT.)

(See FIX.)

(See MICROWAVE LANDING SYSTEM.)

DME SEPARATION- Spacing of aircraft in terms of distances (nautical miles) determined by reference to distance measuring equipment (DME).

(See DISTANCE MEASURING EQUIPMENT.)

DOD FLIP- Department of Defense Flight Information Publications used for flight planning, en route, and terminal operations. FLIP is produced by the National Imagery and Mapping Agency (NIMA) for world-wide use. United States Government Flight Information Publications (en route charts and instrument approach procedure charts) are incorporated in DOD FLIP for use in the National Airspace System (NAS).

DOMESTIC AIRSPACE- Airspace which overlies the continental land mass of the United States plus Hawaii and U.S. possessions. Domestic airspace extends to 12 miles offshore.

DOWNBURST- A strong downdraft which induces an outburst of damaging winds on or near the ground. Damaging winds, either straight or curved, are highly divergent. The sizes of downbursts vary from 1/2 mile or less to more than 10 miles. An intense downburst often causes widespread damage. Damaging winds, lasting 5 to 30 minutes, could reach speeds as high as 120 knots.

DOWNWIND LEG-

(See TRAFFIC PATTERN.)

DP-

(See INSTRUMENT DEPARTURE PROCEDURE.)

DRAG CHUTE- A parachute device installed on certain aircraft which is deployed on landing roll to assist in deceleration of the aircraft.

DSP-

(See DEPARTURE SEQUENCING PROGRAM.)

DT-

(See DELAY TIME.)

DUE REGARD- A phase of flight wherein an aircraft commander of a State-operated aircraft assumes responsibility to separate his aircraft from all other aircraft.

(See also FAAO 7110.65, Para 1-2-1, WORD MEANINGS.)

DUTY RUNWAY-

(See RUNWAY IN USE/ACTIVE RUNWAY/DUTY RUNWAY.)

DVA-

(See DIVERSE VECTOR AREA.)

DVFR-

(See DEFENSE VISUAL FLIGHT RULES.)

DVFR FLIGHT PLAN- A flight plan filed for a VFR aircraft which intends to operate in airspace within which the ready identification, location, and control of aircraft are required in the interest of national security.

DYNAMIC- Continuous review, evaluation, and change to meet demands.

DYNAMIC RESTRICTIONS- Those restrictions imposed by the local facility on an "as needed" basis to manage unpredictable fluctuations in traffic demands.

E

EDCT-

(See EXPECTED DEPARTURE CLEARANCE TIME.)

EFC-

(See EXPECT FURTHER CLEARANCE (TIME).)

ELT-

(See EMERGENCY LOCATOR TRANSMITTER.)

EMERGENCY- A distress or an urgency condition.

EMERGENCY LOCATOR TRANSMITTER- A radio transmitter attached to the aircraft structure which operates from its own power source on 121.5 MHz and 243.0 MHz. It aids in locating downed aircraft by radiating a downward sweeping audio tone, 2-4 times per second. It is designed to function without human action after an accident.

(Refer to FAR Part 91.)

(Refer to AIM.)

E-MSAW-

(See EN ROUTE MINIMUM SAFE ALTITUDE WARNING.)

ENGINEERED PERFORMANCE STANDARDS- A mathematically derived runway capacity standard. EPS's are calculated for each airport on an individual basis and reflect that airport's aircraft mix, operating procedures, runway layout, and specific weather conditions. EPS's do not give consideration to staffing, experience levels, equipment outages, and in-trail restrictions as does the AAR.

EN ROUTE AIR TRAFFIC CONTROL SERVICES- Air traffic control service provided aircraft on IFR flight plans, generally by centers, when these aircraft are operating between departure and destination terminal areas. When equipment, capabilities, and controller workload permit, certain advisory/assistance services may be provided to VFR aircraft.

(See NAS STAGE A.)

(See AIR ROUTE TRAFFIC CONTROL CENTER.)

(Refer to AIM.)

EN ROUTE CHARTS-

(See AERONAUTICAL CHART.)

EN ROUTE DESCENT- Descent from the en route cruising altitude which takes place along the route of flight.

EN ROUTE FLIGHT ADVISORY SERVICE- A service specifically designed to provide, upon pilot request, timely weather information pertinent to his type of flight, intended route of flight, and altitude. The FSS's providing this service are listed in the Airport/Facility Directory.

(See FLIGHT WATCH.)

(Refer to AIM.)

EN ROUTE HIGH ALTITUDE CHARTS-

(See AERONAUTICAL CHART.)

EN ROUTE LOW ALTITUDE CHARTS-

(See AERONAUTICAL CHART.)

EN ROUTE MINIMUM SAFE ALTITUDE WARNING- A function of the NAS Stage A en route computer that aids the controller by alerting him when a tracked aircraft is below or predicted by the computer to go below a predetermined minimum IFR altitude (MIA).

EN ROUTE SPACING PROGRAM- A program designed to assist the exit sector in achieving the required in-trail spacing.

EPS-

(See ENGINEERED PERFORMANCE STANDARDS.)

ESP-

(See EN ROUTE SPACING PROGRAM.)

ESTABLISHED-To be stable or fixed on a route, route segment, altitude, heading, etc.

ESTIMATED ELAPSED TIME [ICAO]- The estimated time required to proceed from one significant point to another.

(See ICAO Term TOTAL ESTIMATED ELAPSED TIME.)

ESTIMATED OFF-BLOCK TIME [ICAO]- The estimated time at which the aircraft will commence movement associated with departure.

ESTIMATED POSITION ERROR (EPE)-

(See Required Navigation Performance)

ESTIMATED TIME OF ARRIVAL- The time the flight is estimated to arrive at the gate (scheduled

operators) or the actual runway on times for nonscheduled operators.

ESTIMATED TIME EN ROUTE- The estimated flying time from departure point to destination (lift-off to touchdown).

ETA-

(See ESTIMATED TIME OF ARRIVAL.)

ETE-

(See ESTIMATED TIME EN ROUTE.)

EXECUTE MISSED APPROACH- Instructions issued to a pilot making an instrument approach which means continue inbound to the missed approach point and execute the missed approach procedure as described on the Instrument Approach Procedure Chart or as previously assigned by ATC. The pilot may climb immediately to the altitude specified in the missed approach procedure upon making a missed approach. No turns should be initiated prior to reaching the missed approach point. When conducting an ASR or PAR approach, execute the assigned missed approach procedure immediately upon receiving instructions to "execute missed approach."

(Refer to AIM.)

EXPECT (ALTITUDE) AT (TIME) or (FIX)- Used under certain conditions to provide a pilot with an altitude to be used in the event of two-way communications failure. It also provides altitude information to assist the pilot in planning.

(Refer to AIM.)

EXPECTED DEPARTURE CLEARANCE TIME- The runway release time assigned to an aircraft in a controlled departure time program and shown on the flight progress strip as an EDCT.

EXPECT FURTHER CLEARANCE (TIME)- The time a pilot can expect to receive clearance beyond a clearance limit.

EXPECT FURTHER CLEARANCE VIA (AIRWAYS, ROUTES OR FIXES)- Used to inform a pilot of the routing he can expect if any part of the route beyond a short range clearance limit differs from that filed.

EXPEDITE- Used by ATC when prompt compliance is required to avoid the development of an imminent situation. Expedite climb/descent normally indicates to a pilot that the approximate best rate of climb/descent should be used without requiring an exceptional change in aircraft handling characteristics.

Check 320 recorded" to indicate that an automated flight inspection is in progress in terminal areas.

(See FLIGHT INSPECTION.)

(Refer to AIM.)

FLIGHT FOLLOWING-

(See TRAFFIC ADVISORIES.)

FLIGHT INFORMATION REGION- An airspace of defined dimensions within which Flight Information Service and Alerting Service are provided.

a. Flight Information Service. A service provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights.

b. Alerting Service. A service provided to notify appropriate organizations regarding aircraft in need of search and rescue aid and to assist such organizations as required.

FLIGHT INFORMATION SERVICE- A service provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights.

FLIGHT INSPECTION- Inflight investigation and evaluation of a navigational aid to determine whether it meets established tolerances.

(See NAVIGATIONAL AID.)

(See FLIGHT CHECK.)

FLIGHT LEVEL- A level of constant atmospheric pressure related to a reference datum of 29.92 inches of mercury. Each is stated in three digits that represent hundreds of feet. For example, flight level (FL) 250 represents a barometric altimeter indication of 25,000 feet; FL 255, an indication of 25,500 feet.

(See ICAO term FLIGHT LEVEL.)

FLIGHT LEVEL [ICAO]- A surface of constant atmospheric pressure which is related to a specific pressure datum, 1013.2 hPa (1013.2 mb), and is separated from other such surfaces by specific pressure intervals.

Note 1: A pressure type altimeter calibrated in accordance with the standard atmosphere:

a. When set to a QNH altimeter setting, will indicate altitude;

b. When set to a QFE altimeter setting, will indicate height above the QFE reference datum; and

c. When set to a pressure of 1013.2 hPa (1013.2 mb), may be used to indicate flight levels.

Note 2: The terms 'height' and 'altitude,' used in Note 1 above, indicate altimetric rather than geometric heights and altitudes.

FLIGHT LINE- A term used to describe the precise movement of a civil photogrammetric aircraft along a predetermined course(s) at a predetermined altitude during the actual photographic run.

FLIGHT MANAGEMENT SYSTEMS- A computer system that uses a large data base to allow routes to be preprogrammed and fed into the system by means of a data loader. The system is constantly updated with respect to position accuracy by reference to conventional navigation aids. The sophisticated program and its associated data base insures that the most appropriate aids are automatically selected during the information update cycle.

FLIGHT MANAGEMENT SYSTEM PROCEDURE- An arrival, departure, or approach procedure developed for use by aircraft with a slant (/) E or slant (/) F equipment suffix.

FLIGHT PATH- A line, course, or track along which an aircraft is flying or intended to be flown.

(See TRACK.)

(See COURSE.)

FLIGHT PLAN- Specified information relating to the intended flight of an aircraft that is filed orally or in writing with an FSS or an ATC facility.

(See FAST FILE.)

(See FILED.)

(Refer to AIM.)

FLIGHT PLAN AREA- The geographical area assigned by regional air traffic divisions to a flight service station for the purpose of search and rescue for VFR aircraft, issuance of NOTAMs, pilot briefing, in-flight services, broadcast, emergency services, flight data processing, international operations, and aviation weather services. Three letter identifiers are assigned to every flight service station and are annotated in AFD's and FAAO 7350.7, LOCATION IDENTIFIERS, as tie-in-facilities.

(See FAST FILE.)

(See FILED.)

(Refer to AIM.)

FLIGHT RECORDER- A general term applied to any instrument or device that records information about the performance of an aircraft in flight or about conditions encountered in flight. Flight recorders may make records of airspeed, outside air temperature, vertical acceleration, engine RPM, manifold pressure, and other pertinent variables for a given flight.

(See ICAO term FLIGHT RECORDER.)

FLIGHT RECORDER [ICAO]- Any type of recorder installed in the aircraft for the purpose of complementing accident/incident investigation.

Note: See Annex 6 Part I, for specifications relating to flight recorders.

FLIGHT SERVICE STATION- Air traffic facilities which provide pilot briefing, en route communications and VFR search and rescue services, assist lost aircraft and aircraft in emergency situations, relay ATC clearances, originate Notices to Airmen, broadcast aviation weather and NAS information, receive and process IFR flight plans, and monitor NAVAID's. In addition, at selected locations, FSS's provide En Route Flight Advisory Service (Flight Watch), take weather observations, issue airport advisories, and advise Customs and Immigration of transborder flights.

(Refer to AIM.)

FLIGHT STANDARDS DISTRICT OFFICE- An FAA field office serving an assigned geographical area and staffed with Flight Standards personnel who serve the aviation industry and the general public on matters relating to the certification and operation of air carrier and general aviation aircraft. Activities include general surveillance of operational safety, certification of airmen and aircraft, accident prevention, investigation, enforcement, etc.

FLIGHT TEST- A flight for the purpose of:

a. Investigating the operation/flight characteristics of an aircraft or aircraft component.

b. Evaluating an applicant for a pilot certificate or rating.

FLIGHT VISIBILITY-

(See VISIBILITY.)

FLIGHT WATCH- A shortened term for use in air-ground contacts to identify the flight service station providing En Route Flight Advisory Service; e.g., "Oakland Flight Watch."

(See EN ROUTE FLIGHT ADVISORY SERVICE.)

FLIP-

(See DOD FLIP.)

FLOW CONTROL- Measures designed to adjust the flow of traffic into a given airspace, along a given route, or bound for a given aerodrome (airport) so as to ensure the most effective utilization of the airspace.

(See QUOTA FLOW CONTROL.)

(Refer to AIRPORT/FACILITY DIRECTORY.)

FLY-BY WAYPOINT- A fly-by waypoint requires the use of turn anticipation to avoid overshoot of the next flight segment.

FLY HEADING (DEGREES)- Informs the pilot of the heading he should fly. The pilot may have to turn to, or continue on, a specific compass direction in order to comply with the instructions. The pilot is expected to turn in the shorter direction to the heading unless otherwise instructed by ATC.

FLY-OVER WAYPOINT- A fly-over waypoint precludes any turn until the waypoint is overflown and is followed by an intercept maneuver of the next flight segment.

FMA-

(See FINAL MONITOR AID.)

FMS-

(See FLIGHT MANAGEMENT SYSTEM.)

FMSP-

(See FLIGHT MANAGEMENT SYSTEM PROCEDURE.)

FORMATION FLIGHT- More than one aircraft which, by prior arrangement between the pilots, operate as a single aircraft with regard to navigation and position reporting. Separation between aircraft within the formation is the responsibility of the flight leader and the pilots of the other aircraft in the flight. This includes transition periods when aircraft within the formation are maneuvering to attain separation from each other to effect individual control and during join-up and breakaway.

a. A standard formation is one in which a proximity of no more than 1 mile laterally or longitudinally and within 100 feet vertically from the flight leader is maintained by each wingman.

b. Nonstandard formations are those operating under any of the following conditions:

1. When the flight leader has requested and ATC has approved other than standard formation dimensions.

2. When operating within an authorized altitude reservation (ALTRV) or under the provisions of a letter of agreement.

3. When the operations are conducted in airspace specifically designed for a special activity.

(See ALTITUDE RESERVATION.)

(Refer to FAR Part 91.)

FRC-

(See REQUEST FULL ROUTE CLEARANCE.)

G

GATE HOLD PROCEDURES- Procedures at selected airports to hold aircraft at the gate or other ground location whenever departure delays exceed or are anticipated to exceed 15 minutes. The sequence for departure will be maintained in accordance with initial call-up unless modified by flow control restrictions. Pilots should monitor the ground control/clearance delivery frequency for engine start/taxi advisories or new proposed start/taxi time if the delay changes.

(See FLOW CONTROL.)

GCA-

(See GROUND CONTROLLED APPROACH.)

GENERAL AVIATION- That portion of civil aviation which encompasses all facets of aviation except air carriers holding a certificate of public convenience and necessity from the Civil Aeronautics Board and large aircraft commercial operators.

(See ICAO term GENERAL AVIATION.)

GENERAL AVIATION [ICAO]- All civil aviation operations other than scheduled air services and nonscheduled air transport operations for remuneration or hire.

GEO MAP- The digitized map markings associated with the ASR-9 Radar System.

GLIDEPATH-

(See GLIDESLOPE.)

GLIDEPATH INTERCEPT ALTITUDE-

(See GLIDESLOPE INTERCEPT ALTITUDE.)

GLIDESLOPE- Provides vertical guidance for aircraft during approach and landing. The glideslope/glidepath is based on the following:

a. Electronic components emitting signals which provide vertical guidance by reference to airborne instruments during instrument approaches such as ILS/MLS, or

b. Visual ground aids, such as VASI, which provide vertical guidance for a VFR approach or for the visual portion of an instrument approach and landing.

c. PAR. Used by ATC to inform an aircraft making a PAR approach of its vertical position (elevation) relative to the descent profile.

(See ICAO term GLIDEPATH.)

GLIDEPATH [ICAO]- A descent profile determined for vertical guidance during a final approach.

GLIDESLOPE INTERCEPT ALTITUDE- The minimum altitude to intercept the glideslope/path on a precision approach. The intersection of the published intercept altitude with the glideslope/path, designated on Government charts by the lightning bolt symbol, is the precision FAF; however, when the approach chart shows an alternative lower glideslope intercept altitude, and ATC directs a lower altitude, the resultant lower intercept position is then the FAF.

(See FINAL APPROACH FIX.)

(See SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE.)

GLOBAL POSITIONING SYSTEM (GPS)- A space-base radio positioning, navigation, and time-transfer system. The system provides highly accurate position and velocity information, and precise time, on a continuous global basis, to an unlimited number of properly equipped users. The system is unaffected by weather, and provides a worldwide common grid reference system. The GPS concept is predicated upon accurate and continuous knowledge of the spatial position of each satellite in the system with respect to time and distance from a transmitting satellite to the user. The GPS receiver automatically selects appropriate signals from the satellites in view and translates these into three-dimensional position, velocity, and time. System accuracy for civil users is normally 100 meters horizontally.

GO AHEAD- Proceed with your message. Not to be used for any other purpose.

GO AROUND- Instructions for a pilot to abandon his approach to landing. Additional instructions may follow. Unless otherwise advised by ATC, a VFR aircraft or an aircraft conducting visual approach should overfly the runway while climbing to traffic pattern altitude and enter the traffic pattern via the crosswind leg. A pilot on an IFR flight plan making an instrument approach should execute the published missed approach procedure or proceed as instructed by ATC; e.g., "Go around" (additional instructions if required).

(See LOW APPROACH.)

(See MISSED APPROACH.)

GPS-

(See Global Positioning System.)

GROUND CLUTTER- A pattern produced on the radar scope by ground returns which may degrade other radar returns in the affected area. The effect of ground clutter is minimized by the use of moving target indicator (MTI) circuits in the radar equipment resulting in a radar presentation which displays only targets which are in motion.

(See CLUTTER.)

GROUND COMMUNICATION OUTLET (GCO)- An unstaffed, remotely controlled, ground/ground communications facility. Pilots at uncontrolled airports may contact ATC and FSS via VHF to a telephone connection to obtain an instrument clearance or close a VFR or IFR flight plan. They may also get an updated weather briefing prior to take-off. Pilots will use four "key clicks" on the VHF radio to contact the appropriate ATC facility or six "key clicks " to contact the FSS. The GCO system is intended to be used only on the ground.

GROUND CONTROLLED APPROACH- A radar approach system operated from the ground by air traffic control personnel transmitting instructions to the pilot by radio. The approach may be conducted with surveillance radar (ASR) only or with both surveillance and precision approach radar (PAR). Usage of the term "GCA" by pilots is discouraged except when referring to a GCA facility. Pilots should specifically request a "PAR" approach when a precision radar approach is desired or request an "ASR" or "surveillance" approach when a nonprecision radar approach is desired.

(See RADAR APPROACH.)

GROUND DELAY- The amount of delay attributed to ATC, encountered prior to departure, usually associated with a CDT program.

GROUND SPEED- The speed of an aircraft relative to the surface of the earth.

GROUND STOP- Normally, the last initiative to be utilized; this method mandates that the terminal facility will not allow any departures to enter the ARTCC airspace until further notified.

GROUND VISIBILITY-

(See VISIBILITY.)

I

IAF-
(See INITIAL APPROACH FIX.)

IAP-
(See INSTRUMENT APPROACH PROCEDURE.)

IAWP- Initial Approach Waypoint

ICAO-
(See ICAO Term INTERNATIONAL CIVIL AVIATION ORGANIZATION.)

ICING- The accumulation of airframe ice.

Types of icing are:

a. Rime Ice- Rough, milky, opaque ice formed by the instantaneous freezing of small supercooled water droplets.

b. Clear Ice- A glossy, clear, or translucent ice formed by the relatively slow freezing or large supercooled water droplets.

c. Mixed- A mixture of clear ice and rime ice.

Intensity of icing:

a. Trace- Ice becomes perceptible. Rate of accumulation is slightly greater than the rate of sublimation. Deicing/anti-icing equipment is not utilized unless encountered for an extended period of time (over 1 hour).

b. Light- The rate of accumulation may create a problem if flight is prolonged in this environment (over 1 hour). Occasional use of deicing/anti-icing equipment removes/prevents accumulation. It does not present a problem if the deicing/anti-icing equipment is used.

c. Moderate- The rate of accumulation is such that even short encounters become potentially hazardous and use of deicing/anti-icing equipment or flight diversion is necessary.

d. Severe- The rate of accumulation is such that deicing/anti-icing equipment fails to reduce or control the hazard. Immediate flight diversion is necessary.

IDENT- A request for a pilot to activate the aircraft transponder identification feature. This will help the controller to confirm an aircraft identity or to identify an aircraft.
(Refer to AIM.)

IDENT FEATURE- The special feature in the Air Traffic Control Radar Beacon System (ATCRBS) equipment. It is used to immediately distinguish one displayed beacon target from other beacon targets.
(See IDENT.)

IF-
(See INTERMEDIATE FIX.)

IFIM-
(See INTERNATIONAL FLIGHT INFORMATION MANUAL.)

IF NO TRANSMISSION RECEIVED FOR (TIME)- Used by ATC in radar approaches to prefix procedures which should be followed by the pilot in event of lost communications.
(See LOST COMMUNICATIONS.)

IFR-
(See INSTRUMENT FLIGHT RULES.)

IFR AIRCRAFT- An aircraft conducting flight in accordance with instrument flight rules.

IFR CONDITIONS- Weather conditions below the minimum for flight under visual flight rules.
(See INSTRUMENT METEOROLOGICAL CONDITIONS.)

IFR DEPARTURE PROCEDURE-
(See IFR TAKEOFF MINIMUMS AND DEPARTURE PROCEDURES.)
(Refer to AIM.)

IFR FLIGHT-
(See IFR AIRCRAFT.)

IFR LANDING MINIMUMS-
(See LANDING MINIMUMS.)

IFR MILITARY TRAINING ROUTES (IR)- Routes used by the Department of Defense and associated Reserve and Air Guard units for the purpose of conducting low-altitude navigation and tactical training in both IFR and VFR weather conditions below 10,000 feet MSL at airspeeds in excess of 250 knots IAS.

IFR TAKEOFF MINIMUMS AND DEPARTURE PROCEDURES- Federal Aviation Regulations, Part 91, prescribes standard takeoff rules for certain civil users. At some airports, obstructions or other factors require the establishment of nonstandard takeoff minimums, departure procedures, or both to assist pilots in avoiding obstacles during climb to the minimum en route altitude. Those airports are listed in NOS/DOD Instrument Approach Charts (IAP's) under a section entitled "IFR Takeoff Minimums and Departure Proce-

dures." The NOS/DOD IAP chart legend illustrates the symbol used to alert the pilot to nonstandard takeoff minimums and departure procedures. When departing IFR from such airports or from any airports where there are no departure procedures, DP's, or ATC facilities available, pilots should advise ATC of any departure limitations. Controllers may query a pilot to determine acceptable departure directions, turns, or headings after takeoff. Pilots should be familiar with the departure procedures and must assure that their aircraft can meet or exceed any specified climb gradients.

IF/IAWP- Intermediate Fix/Initial Approach Waypoint. The waypoint where the final approach course of a T approach meets the crossbar of the T. When designated (in conjunction with a TAA) this waypoint will be used as an IAWP when approaching the airport from certain directions, and as an IFWP when beginning the approach from another IAWP.

IFWP- Intermediate Fix Waypoint

ILS-
(See INSTRUMENT LANDING SYSTEM.)

ILS CATEGORIES- 1. ILS Category I. An ILS approach procedure which provides for approach to a height above touchdown of not less than 200 feet and with runway visual range of not less than 1,800 feet.- 2. ILS Category II. An ILS approach procedure which provides for approach to a height above touchdown of not less than 100 feet and with runway visual range of not less than 1,200 feet.- 3. ILS Category III:

a. IIIA.-An ILS approach procedure which provides for approach without a decision height minimum and with runway visual range of not less than 700 feet.

b. IIIB.-An ILS approach procedure which provides for approach without a decision height minimum and with runway visual range of not less than 150 feet.

c. IIIC.-An ILS approach procedure which provides for approach without a decision height minimum and without runway visual range minimum.

ILS PRM APPROACH- An instrument landing system (ILS) approach conducted to parallel runways whose extended centerlines are separated by less than 4,300 feet and the parallel runways have a Precision Runway Monitoring (PRM) system that permits simultaneous independent ILS approaches.

IM-
(See INNER MARKER.)

IMC-
(See INSTRUMENT METEOROLOGICAL CONDITIONS.)

IMMEDIATELY- Used by ATC or pilots when such action compliance is required to avoid an imminent situation.

INCERFA Uncertainty Phase) [ICAO]- A situation wherein uncertainty exists as to the safety of an aircraft and its occupants.

INCREASE SPEED TO (SPEED)-
(See SPEED ADJUSTMENT.)

INERTIAL NAVIGATION SYSTEM- An RNAV system which is a form of self-contained navigation.
(See Area Navigation/RNAV.)

INFLIGHT REFUELING-
(See AERIAL REFUELING.)

INFLIGHT WEATHER ADVISORY-
(See WEATHER ADVISORY.)

INFORMATION REQUEST- A request originated by an FSS for information concerning an overdue VFR aircraft.

INITIAL APPROACH FIX- The fixes depicted on instrument approach procedure charts that identify the beginning of the initial approach segment(s).
(See FIX.)
(See SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE.)

INITIAL APPROACH SEGMENT-
(See SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE.)

INITIAL APPROACH SEGMENT [ICAO]- That segment of an instrument approach procedure between the initial approach fix and the intermediate approach fix or, where applicable, the final approach fix or point.

INLAND NAVIGATION FACILITY- A navigation aid on a North American Route at which the common route and/or the noncommon route begins or ends.

INNER MARKER- A marker beacon used with an ILS (CAT II) precision approach located between the middle marker and the end of the ILS runway, transmitting a radiation pattern keyed at six dots per second and indicating to the pilot, both aurally and visually, that he is at the designated decision height (DH), normally 100 feet above the touchdown zone elevation, on the ILS CAT II approach. It also marks progress during a CAT III approach.
(See INSTRUMENT LANDING SYSTEM.)
(Refer to AIM.)

INNER MARKER BEACON-
(See INNER MARKER.)

INREQ-
(See INFORMATION REQUEST.)

INS-
(See INERTIAL NAVIGATION SYSTEM.)

INSTRUMENT APPROACH-
(See INSTRUMENT APPROACH PROCEDURE.)

INSTRUMENT APPROACH PROCEDURE- A series of predetermined maneuvers for the orderly transfer of an aircraft under instrument flight conditions from the beginning of the initial approach to a landing or to a point from which a landing may be made visually. It is prescribed and approved for a specific airport by competent authority.
(See SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE.)
(Refer to FAR Part 91.)
(See AIM.)

a. U.S. civil standard instrument approach procedures are approved by the FAA as prescribed under Part 97 and are available for public use.

b. U.S. military standard instrument approach procedures are approved and published by the Department of Defense.

c. Special instrument approach procedures are approved by the FAA for individual operators but are not published in Part 97 for public use.
(See ICAO term INSTRUMENT APPROACH PROCEDURE.)

INSTRUMENT APPROACH PROCEDURE [ICAO]- A series of predetermined maneuvers by reference to flight instruments with specified protection from obstacles from the initial approach fix, or where applicable, from the beginning of a defined arrival route to a point from which a landing can be completed and thereafter, if a landing is not completed, to a position at which holding or en route obstacle clearance criteria apply.

INSTRUMENT APPROACH PROCEDURES CHARTS-
(See AERONAUTICAL CHART.)

INSTRUMENT DEPARTURE PROCEDURE (DP)- A preplanned instrument flight rule (IFR) air traffic control departure procedure printed for pilot use in graphic and/or textual form. DP's provide transition from the terminal to the appropriate en route structure.
(See IFR TAKEOFF MINIMUMS AND DEPARTURE PROCEDURES.)
(Refer to AIM.)

INSTRUMENT DEPARTURE PROCEDURE (DP) CHARTS-
(See AERONAUTICAL CHART.)

INSTRUMENT FLIGHT RULES- Rules governing the procedures for conducting instrument flight. Also a term used by pilots and controllers to indicate type of flight plan.
(See VISUAL FLIGHT RULES.)
(See INSTRUMENT METEOROLOGICAL CONDITIONS.)
(See VISUAL METEOROLOGICAL CONDITIONS.)
(Refer to AIM.)
(See ICAO term INSTRUMENT FLIGHT RULES.)

INSTRUMENT FLIGHT RULES [ICAO]- A set of rules governing the conduct of flight under instrument meteorological conditions.

INSTRUMENT LANDING SYSTEM- A precision instrument approach system which normally consists of the following electronic components and visual aids:

a. Localizer.
(See LOCALIZER.)

b. Glideslope.
(See GLIDESLOPE.)

c. Outer Marker.
(See OUTER MARKER.)

d. Middle Marker.
(See MIDDLE MARKER.)

e. Approach Lights.
(See AIRPORT LIGHTING.)
(Refer to FAR Part 91.)
(See AIM.)

INSTRUMENT METEOROLOGICAL CONDITIONS- Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling less than the minima specified for visual meteorological conditions.
(See VISUAL METEOROLOGICAL CONDITIONS.)
(See INSTRUMENT FLIGHT RULES.)
(See VISUAL FLIGHT RULES.)

INSTRUMENT RUNWAY- A runway equipped with electronic and visual navigation aids for which a precision or nonprecision approach procedure having straight-in landing minimums has been approved.
(See ICAO term INSTRUMENT RUNWAY.)

INSTRUMENT RUNWAY [ICAO]- One of the following types of runways intended for the operation of aircraft using instrument approach procedures:

a. Nonprecision Approach Runway-An instrument runway served by visual aids and a nonvisual aid providing at least directional guidance adequate for a straight-in approach.

b. Precision Approach Runway, Category I-An instrument runway served by ILS and visual aids intended for operations down to 60 m (200 feet) decision height and down to an RVR of the order of 800 m.

c. Precision Approach Runway, Category II-An instrument runway served by ILS and visual aids intended for operations down to 30 m (100 feet) decision height and down to an RVR of the order of 400 m.

d. Precision Approach Runway, Category III-An instrument runway served by ILS to and along the surface of the runway and:

1. Intended for operations down to an RVR of the order of 200 m (no decision height being applicable) using visual aids during the final phase of landing;

2. Intended for operations down to an RVR of the order of 50 m (no decision height being applicable) using visual aids for taxiing;

3. Intended for operations without reliance on visual reference for landing or taxiing.

Note 1: See Annex 10 Volume I, Part I, Chapter 3, for related ILS specifications.

Note 2: Visual aids need not necessarily be matched to the scale of nonvisual aids provided. The criterion for the selection of visual aids is the conditions in which operations are intended to be conducted.

INTEGRITY- The ability of a system to provide timely warnings to users when the system should not be used for navigation.

INTERMEDIATE APPROACH SEGMENT-
(See SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE.)

INTERMEDIATE APPROACH SEGMENT [ICAO]- That segment of an instrument approach procedure between either the intermediate approach fix and the final approach fix or point, or between the end of a reversal, race track or dead reckoning track procedure and the final approach fix or point, as appropriate.

INTERMEDIATE FIX- The fix that identifies the beginning of the intermediate approach segment of an instrument approach procedure. The fix is not normally identified on the instrument approach chart as an intermediate fix (IF).
(See SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE.)

INTERMEDIATE LANDING- On the rare occasion that this option is requested, it should be approved. The departure center, however, must advise the ATCSCC so that the appropriate delay is carried over and assigned at the intermediate airport. An intermediate landing airport within the arrival center will not be accepted without coordination with and the approval of the ATCSCC.

INTERNATIONAL AIRPORT- Relating to international flight, it means:

a. An airport of entry which has been designated by the Secretary of Treasury or Commissioner of Customs as an international airport for customs service.

b. A landing rights airport at which specific permission to land must be obtained from customs authorities in advance of contemplated use.

c. Airports designated under the Convention on International Civil Aviation as an airport for use by international commercial air transport and/or international general aviation.
(Refer to AIRPORT/FACILITY DIRECTORY.)
(Refer to IFIM.)
(See ICAO term INTERNATIONAL AIRPORT.)

INTERNATIONAL AIRPORT [ICAO]- Any airport designated by the Contracting State in whose territory it is situated as an airport of entry and departure for international air traffic, where the formalities incident to customs, immigration, public health, animal and plant quarantine and similar procedures are carried out.

INTERNATIONAL CIVIL AVIATION ORGANIZATION [ICAO]- A specialized agency of the United Nations whose objective is to develop the principles and techniques of international air navigation and to foster planning and development of international civil air transport.

a. Regions include:

1. African-Indian Ocean Region

2. Caribbean Region

L

LAA-

(See LOCAL AIRPORT ADVISORY.)

LAAS-

(See LOW ALTITUDE ALERT SYSTEM.)

LAHSO- An acronym for "Land and Hold Short Operation." These operations include landing and holding short of an intersecting runway, a taxiway, a predetermined point, or an approach/departure flightpath.

LAHSO-DRY- Land and hold short operations on runways that are dry.

LAHSO-WET- Land and hold short operations on runways that are wet (but not contaminated).

LAND AND HOLD SHORT OPERATIONS- Operations which include simultaneous takeoffs and landings and/or simultaneous landings when a landing aircraft is able and is instructed by the controller to hold-short of the intersecting runway/taxiway or designated hold-short point. Pilots are expected to promptly inform the controller if the hold short clearance cannot be accepted.

(See PARALLEL RUNWAYS.)

(Refer to AIM.)

LANDING AREA- Any locality either on land, water, or structures, including airports/heliports and intermediate landing fields, which is used, or intended to be used, for the landing and takeoff of aircraft whether or not facilities are provided for the shelter, servicing, or for receiving or discharging passengers or cargo.

(See ICAO term LANDING AREA.)

LANDING AREA [ICAO]- That part of a movement area intended for the landing or takeoff of aircraft.

LANDING DIRECTION INDICATOR- A device which visually indicates the direction in which landings and takeoffs should be made.

(See TETRAHEDRON.)

(Refer to AIM.)

LANDING DISTANCE AVAILABLE [ICAO]- The length of runway which is declared available and suitable for the ground run of an aeroplane landing.

LANDING MINIMUMS- The minimum visibility prescribed for landing a civil aircraft while using an instrument approach procedure. The minimum applies with other limitations set forth in FAR Part 91 with respect to the Minimum Descent Altitude (MDA) or Decision Height (DH) prescribed in the instrument approach procedures as follows:

a. Straight-in landing minimums. A statement of MDA and visibility, or DH and visibility, required for a straight - in landing on a specified runway, or

b. Circling minimums. A statement of MDA and visibility required for the circle-to-land maneuver.

Note: Descent below the established MDA or DH is not authorized during an approach unless the aircraft is in a position from which a normal approach to the runway of intended landing can be made and adequate visual reference to required visual cues is maintained.

(See STRAIGHT-IN LANDING.)

(See CIRCLE-TO-LAND MANEUVER.)

(See DECISION HEIGHT.)

(See MINIMUM DESCENT ALTITUDE.)

(See VISIBILITY.)

(See INSTRUMENT APPROACH PROCEDURE.)

(Refer to FAR Part 91.)

LANDING ROLL- The distance from the point of touchdown to the point where the aircraft can be brought to a stop or exit the runway.

LANDING SEQUENCE- The order in which aircraft are positioned for landing.

(See APPROACH SEQUENCE.)

LAST ASSIGNED ALTITUDE- The last altitude/flight level assigned by ATC and acknowledged by the pilot.

(See MAINTAIN.)

(Refer to FAR Part 91.)

LATERAL NAVIGATION (LNAV)– A function of area navigation (RNAV) equipment which calculates, displays, and provides lateral guidance to a profile or path.

LATERAL SEPARATION- The lateral spacing of aircraft at the same altitude by requiring operation on different routes or in different geographical locations.

(See SEPARATION.)

LDA-

(See LOCALIZER TYPE DIRECTIONAL AID.)

(See ICAO Term LANDING DISTANCE AVAILABLE.)

LF-

(See LOW FREQUENCY.)

LIGHTED AIRPORT- An airport where runway and obstruction lighting is available.
(See AIRPORT LIGHTING.)
(Refer to AIM.)

LIGHT GUN- A handheld directional light signaling device which emits a brilliant narrow beam of white, green, or red light as selected by the tower controller. The color and type of light transmitted can be used to approve or disapprove anticipated pilot actions where radio communication is not available. The light gun is used for controlling traffic operating in the vicinity of the airport and on the airport movement area.
(Refer to AIM.)

LOCALIZER- The component of an ILS which provides course guidance to the runway.
(See INSTRUMENT LANDING SYSTEM.)
(Refer to AIM.)
(See ICAO term LOCALIZER COURSE.)

LOCALIZER COURSE [ICAO]- The locus of points, in any given horizontal plane, at which the DDM (difference in depth of modulation) is zero.

LOCALIZER OFFSET- An angular offset of the localizer from the runway extended centerline in a direction away from the no transgression zone (NTZ) that increases the normal operating zone (NOZ) width. An offset requires a 50 foot increase in DH and is not authorized for CAT II and CAT III approaches.

LOCALIZER TYPE DIRECTIONAL AID- A NAVAID used for nonprecision instrument approaches with utility and accuracy comparable to a localizer but which is not a part of a complete ILS and is not aligned with the runway.
(Refer to AIM.)

LOCALIZER USABLE DISTANCE- The maximum distance from the localizer transmitter at a specified altitude, as verified by flight inspection, at which reliable course information is continuously received.
(Refer to AIM.)

LOCAL AIRPORT ADVISORY [LAA]- A service provided by flight service stations or the military at airports not serviced by an operating control tower. This service consists of providing information to arriving and departing aircraft concerning wind direction and speed, favored runway, altimeter setting, pertinent known traffic, pertinent known field conditions, airport taxi routes and traffic patterns, and authorized instrument approach procedures. This information is advisory in nature and does not constitute an ATC clearance.
(See AIRPORT ADVISORY AREA.)

LOCAL TRAFFIC- Aircraft operating in the traffic pattern or within sight of the tower, or aircraft known to be departing or arriving from flight in local practice areas, or aircraft executing practice instrument approaches at the airport.
(See TRAFFIC PATTERN.)

LOCATOR [ICAO]- An LM/MF NDB used as an aid to final approach.
Note: A locator usually has an average radius of rated coverage of between 18.5 and 46.3 km (10 and 25 NM).

LONGITUDINAL SEPARATION- The longitudinal spacing of aircraft at the same altitude by a minimum distance expressed in units of time or miles.
(See SEPARATION.)
(Refer to AIM.)

LONG RANGE NAVIGATION-
(See LORAN.)

LORAN- An electronic navigational system by which hyperbolic lines of position are determined by measuring the difference in the time of reception of synchronized pulse signals from two fixed transmitters. Loran A operates in the 1750-1950 kHz frequency band. Loran C and D operate in the 100-110 kHz frequency band.
(Refer to AIM.)

LOST COMMUNICATIONS- Loss of the ability to communicate by radio. Aircraft are sometimes referred to as NORDO (No Radio). Standard pilot procedures are specified in Part 91. Radar controllers issue procedures for pilots to follow in the event of lost communications during a radar approach when weather reports indicate that an aircraft will likely encounter IFR weather conditions during the approach.
(Refer to FAR Part 91.)
(Refer AIM.)

LOW ALTITUDE AIRWAY STRUCTURE- The network of airways serving aircraft operations up to but not including 18,000 feet MSL.
(See AIRWAY.)
(Refer to AIM.)

LOW ALTITUDE ALERT, CHECK YOUR ALTITUDE IMMEDIATELY-
(See SAFETY ALERT.)

LOW ALTITUDE ALERT SYSTEM- An automated function of the TPX-42 that alerts the controller when a Mode C transponder - equipped aircraft on an IFR flight plan is below a predetermined minimum safe altitude. If requested by the pilot, LAAS monitoring is

M

M-EARTS-
(See MICRO-EN ROUTE AUTOMATED RADAR TRACKING SYSTEM.)

MAA-
(See MAXIMUM AUTHORIZED ALTITUDE.)

MACH NUMBER- The ratio of true airspeed to the speed of sound; e.g., MACH .82, MACH 1.6.
(See AIRSPEED.)

MACH TECHNIQUE [ICAO]- Describes a control technique used by air traffic control whereby turbojet aircraft operating successively along suitable routes are cleared to maintain appropriate MACH numbers for a relevant portion of the en route phase of flight. The principle objective is to achieve improved utilization of the airspace and to ensure that separation between successive aircraft does not decrease below the established minima.

MAHWP- Missed Approach Holding Waypoint

MAINTAIN-

a. Concerning altitude/flight level, the term means to remain at the altitude/flight level specified. The phrase "climb and" or "descend and" normally precedes "maintain" and the altitude assignment; e.g., "descend and maintain 5,000."

b. Concerning other ATC instructions, the term is used in its literal sense; e.g., maintain VFR.

MAINTENANCE PLANNING FRICTION LEVEL- The friction level specified in AC 150/5320-12, Measurement, Construction, and Maintenance of Skid Resistant Airport Pavement Surfaces, which represents the friction value below which the runway pavement surface remains acceptable for any category or class of aircraft operations but which is beginning to show signs of deterioration. This value will vary depending on the particular friction measurement equipment used.

MAKE SHORT APPROACH- Used by ATC to inform a pilot to alter his traffic pattern so as to make a short final approach.
(See TRAFFIC PATTERN.)

MANDATORY ALTITUDE- An altitude depicted on an instrument Approach Procedure Chart requiring the aircraft to maintain altitude at the depicted value.

MAP-
(See MISSED APPROACH POINT.)

MARKER BEACON- An electronic navigation facility transmitting a 75 mHz vertical fan or boneshaped radiation pattern. Marker beacons are identified by their modulation frequency and keying code, and when received by compatible airborne equipment, indicate to the pilot, both aurally and visually, that he is passing over the facility.
(See OUTER MARKER.)
(See MIDDLE MARKER.)
(See INNER MARKER.)
(Refer to AIM.)

MARSA-
(See MILITARY AUTHORITY ASSUMES RESPONSIBILITY FOR SEPARATION OF AIRCRAFT.)

MAWP- Missed Approach Waypoint

MAXIMUM AUTHORIZED ALTITUDE- A published altitude representing the maximum usable altitude or flight level for an airspace structure or route segment. It is the highest altitude on a Federal airway, jet route, area navigation low or high route, or other direct route for which an MEA is designated in Part 95 at which adequate reception of navigation aid signals is assured.

MAYDAY- The international radiotelephony distress signal. When repeated three times, it indicates imminent and grave danger and that immediate assistance is requested.
(See PAN-PAN-PAN.)
(Refer to AIM.)

MCA-
(See MINIMUM CROSSING ALTITUDE.)

MDA-
(See MINIMUM DESCENT ALTITUDE.)

MEA-
(See MINIMUM EN ROUTE IFR ALTITUDE.)

METEOROLOGICAL IMPACT STATEMENT- An unscheduled planning forecast describing conditions expected to begin within 4 to 12 hours which may impact the flow of air traffic in a specific center's (ARTCC) area.

METER FIX TIME/SLOT TIME- A calculated time to depart the meter fix in order to cross the vertex at the ACLT. This time reflects descent speed adjustment and

any applicable time that must be absorbed prior to crossing the meter fix.

METER LIST DISPLAY INTERVAL- A dynamic parameter which controls the number of minutes prior to the flight plan calculated time of arrival at the meter fix for each aircraft, at which time the TCLT is frozen and becomes an ACLT; i.e., the VTA is updated and consequently the TCLT modified as appropriate until frozen at which time updating is suspended and an ACLT is assigned. When frozen, the flight entry is inserted into the arrival sector's meter list for display on the sector PVD/MDM. MLDI is used if filed true airspeed is less than or equal to freeze speed parameters (FSPD).

METERING- A method of time-regulating arrival traffic flow into a terminal area so as not to exceed a predetermined terminal acceptance rate.

METERING AIRPORTS- Airports adapted for metering and for which optimum flight paths are defined. A maximum of 15 airports may be adapted.

METERING FIX- A fix along an established route from over which aircraft will be metered prior to entering terminal airspace. Normally, this fix should be established at a distance from the airport which will facilitate a profile descent 10,000 feet above airport elevation [AAE] or above.

METERING POSITION(S)- Adapted PVD's/MDM's and associated "D" positions eligible for display of a metering position list. A maximum of four PVD's/MDM's may be adapted.

METERING POSITION LIST- An ordered list of data on arrivals for a selected metering airport displayed on a metering position PVD/MDM.

MFT-
(See METER FIX TIME/SLOT TIME.)

MHA-
(See MINIMUM HOLDING ALTITUDE.)

MIA-
(See MINIMUM IFR ALTITUDES.)

MICROBURST- A small downburst with outbursts of damaging winds extending 2.5 miles or less. In spite of its small horizontal scale, an intense microburst could induce wind speeds as high as 150 knots
(Refer to AIM.)

MICRO-EN ROUTE AUTOMATED RADAR TRACKING SYSTEM (M-EARTS)- An automated radar and radar beacon tracking system capable of employing both short-range (ASR) and long-range (ARSR) radars. This microcomputer driven system provides improved tracking, continuous data recording, and use of full digital radar displays.

MICROWAVE LANDING SYSTEM- A precision instrument approach system operating in the microwave spectrum which normally consists of the following components:

a. Azimuth Station.

b. Elevation Station.

c. Precision Distance Measuring Equipment.
(See MLS CATEGORIES.)

MIDDLE COMPASS LOCATOR-
(See COMPASS LOCATOR.)

MIDDLE MARKER- A marker beacon that defines a point along the glideslope of an ILS normally located at or near the point of decision height (ILS Category I). It is keyed to transmit alternate dots and dashes, with the alternate dots and dashes keyed at the rate of 95 dot/dash combinations per minute on a 1300 Hz tone, which is received aurally and visually by compatible airborne equipment.
(See MARKER BEACON.)
(See INSTRUMENT LANDING SYSTEM.)
(Refer to AIM.)

MID RVR-
(See VISIBILITY.)

MILES-IN-TRAIL- A specified distance between aircraft, normally, in the same stratum associated with the same destination or route of flight.

MILITARY AUTHORITY ASSUMES RESPONSIBILITY FOR SEPARATION OF AIRCRAFT- A condition whereby the military services involved assume responsibility for separation between participating military aircraft in the ATC system. It is used only for required IFR operations which are specified in letters of agreement or other appropriate FAA or military documents.

MILITARY OPERATIONS AREA-
(See SPECIAL USE AIRSPACE.)

MILITARY TRAINING ROUTES- Airspace of defined vertical and lateral dimensions established for the conduct of military flight training at airspeeds in excess of 250 knots IAS.
(See IFR MILITARY TRAINING ROUTES.)
(See VFR MILITARY TRAINING ROUTES.)

MINIMA-
(See MINIMUMS.)

MINIMUM CROSSING ALTITUDE- The lowest altitude at certain fixes at which an aircraft must cross when proceeding in the direction of a higher minimum en route IFR altitude (MEA).

(See MINIMUM EN ROUTE IFR ALTITUDE.)

MINIMUM DESCENT ALTITUDE- The lowest altitude, expressed in feet above mean sea level, to which descent is authorized on final approach or during circle-to-land maneuvering in execution of a standard instrument approach procedure where no electronic glideslope is provided.

(See NONPRECISION APPROACH PROCEDURE.)

MINIMUM EN ROUTE IFR ALTITUDE- The lowest published altitude between radio fixes which assures acceptable navigational signal coverage and meets obstacle clearance requirements between those fixes. The MEA prescribed for a Federal airway or segment thereof, area navigation low or high route, or other direct route applies to the entire width of the airway, segment, or route between the radio fixes defining the airway, segment, or route.

(Refer to Part 91.)

(Refer to Part 95.)

(Refer to AIM.)

MINIMUM FRICTION LEVEL- The friction level specified in AC 150/5320-12, Measurement, Construction, and Maintenance of Skid Resistant Airport Pavement Surfaces, that represents the minimum recommended wet pavement surface friction value for any turbojet aircraft engaged in LAHSO. This value will vary with the particular friction measurement equipment used.

MINIMUM FUEL- Indicates that an aircraft's fuel supply has reached a state where, upon reaching the destination, it can accept little or no delay. This is not an emergency situation but merely indicates an emergency situation is possible should any undue delay occur.

(Refer to AIM.)

MINIMUM HOLDING ALTITUDE- The lowest altitude prescribed for a holding pattern which assures navigational signal coverage, communications, and meets obstacle clearance requirements.

MINIMUM IFR ALTITUDES- Minimum altitudes for IFR operations as prescribed in Part 91. These altitudes are published on aeronautical charts and prescribed in Part 95 for airways and routes, and in Part 97 for standard instrument approach procedures. If no applicable minimum altitude is prescribed in FAR 95 or FAR 97, the following minimum IFR altitude applies:

a. In designated mountainous areas, 2,000 feet above the highest obstacle within a horizontal distance of 4 nautical miles from the course to be flown; or

b. Other than mountainous areas, 1,000 feet above the highest obstacle within a horizontal distance of 4 nautical miles from the course to be flown; or

c. As otherwise authorized by the Administrator or assigned by ATC.

(See MINIMUM EN ROUTE IFR ALTITUDE.)

(See MINIMUM OBSTRUCTION CLEARANCE ALTITUDE.)

(See MINIMUM CROSSING ALTITUDE.)

(See MINIMUM SAFE ALTITUDE.)

(See MINIMUM VECTORING ALTITUDE.)

(Refer to Part 91.)

MINIMUM NAVIGATION PERFORMANCE SPECIFICATION- A set of standards which require aircraft to have a minimum navigation performance capability in order to operate in MNPS designated airspace. In addition, aircraft must be certified by their State of Registry for MNPS operation.

MINIMUM NAVIGATION PERFORMANCE SPECIFICATION AIRSPACE- Designated airspace in which MNPS procedures are applied between MNPS certified and equipped aircraft. Under certain conditions, non-MNPS aircraft can operate in MNPSA. However, standard oceanic separation minima is provided between the non-MNPS aircraft and other traffic. Currently, the only designated MNPSA is described as follows:

a. Between FL 285 and FL 420;

b. Between latitudes 27°N and the North Pole;

c. In the east, the eastern boundaries of the CTA's Santa Maria Oceanic, Shanwick Oceanic, and Reykjavik;

d. In the west, the western boundaries of CTA's Reykjavik and Gander Oceanic and New York Oceanic excluding the area west of 60°W and south of 38°30'N.

MINIMUM OBSTRUCTION CLEARANCE ALTITUDE- The lowest published altitude in effect between radio fixes on VOR airways, off-airway routes, or route segments which meets obstacle clearance requirements for the entire route segment and which assures acceptable navigational signal coverage only within 25 statute (22 nautical) miles of a VOR.

(Refer to Part 91.)

(Refer to Part 95.)

MINIMUM RECEPTION ALTITUDE- The lowest altitude at which an intersection can be determined.

(Refer to Part 95.)

MINIMUM SAFE ALTITUDE-

a. The minimum altitude specified in Part 91 for various aircraft operations.

b. Altitudes depicted on approach charts which provide at least 1,000 feet of obstacle clearance for emergency use within a specified distance from the navigation facility upon which a procedure is predicated. These altitudes will be identified as Minimum Sector Altitudes or Emergency Safe Altitudes and are established as follows:

1. Minimum Sector Altitudes. Altitudes depicted on approach charts which provide at least 1,000 feet of obstacle clearance within a 25-mile radius of the navigation facility upon which the procedure is predicated. Sectors depicted on approach charts must be at least 90 degrees in scope. These altitudes are for emergency use only and do not necessarily assure acceptable navigational signal coverage.

(See ICAO term Minimum Sector Altitude.)

2. Emergency Safe Altitudes. Altitudes depicted on approach charts which provide at least 1,000 feet of obstacle clearance in nonmountainous areas and 2,000 feet of obstacle clearance in designated mountainous areas within a 100-mile radius of the navigation facility upon which the procedure is predicated and normally used only in military procedures. These altitudes are identified on published procedures as "Emergency Safe Altitudes."

MINIMUM SAFE ALTITUDE WARNING- A function of the ARTS III computer that aids the controller by alerting him when a tracked Mode C- equipped aircraft is below or is predicted by the computer to go below a predetermined minimum safe altitude.

(Refer to AIM.)

MINIMUM SECTOR ALTITUDE [ICAO]- The lowest altitude which may be used under emergency conditions which will provide a minimum clearance of 300 m (1,000 feet) above all obstacles located in an area contained within a sector of a circle of 46 km (25 NM) radius centered on a radio aid to navigation.

MINIMUMS- Weather condition requirements established for a particular operation or type of operation; e.g., IFR takeoff or landing, alternate airport for IFR flight plans, VFR flight, etc.

(See LANDING MINIMUMS.)

(See IFR TAKEOFF MINIMUMS AND DEPARTURE PROCEDURES.)

(See VFR CONDITIONS.)

(See IFR CONDITIONS.)

(Refer to Part 91.)

(Refer to AIM.)

MINIMUM VECTORING ALTITUDE- The lowest MSL altitude at which an IFR aircraft will be vectored by a radar controller, except as otherwise authorized for radar approaches, departures, and missed approaches. The altitude meets IFR obstacle clearance criteria. It may be lower than the published MEA along an airway or J-route segment. It may be utilized for radar vectoring only upon the controller's determination that an adequate radar return is being received from the aircraft being controlled. Charts depicting minimum vectoring altitudes are normally available only to the controllers and not to pilots.

(Refer to AIM.)

MINUTES-IN-TRAIL- A specified interval between aircraft expressed in time. This method would more likely be utilized regardless of altitude.

MIS-

(See METEOROLOGICAL IMPACT STATEMENT.)

MISSED APPROACH-

a. A maneuver conducted by a pilot when an instrument approach cannot be completed to a landing. The route of flight and altitude are shown on instrument approach procedure charts. A pilot executing a missed approach prior to the Missed Approach Point (MAP) must continue along the final approach to the MAP. The pilot may climb immediately to the altitude specified in the missed approach procedure.

b. A term used by the pilot to inform ATC that he is executing the missed approach.

c. At locations where ATC radar service is provided, the pilot should conform to radar vectors when provided by ATC in lieu of the published missed approach procedure.

(See MISSED APPROACH POINT.)

(Refer to AIM.)

MISSED APPROACH POINT- A point prescribed in each instrument approach procedure at which a missed

O

OBSTACLE- An existing object, object of natural growth, or terrain at a fixed geographical location or which may be expected at a fixed location within a prescribed area with reference to which vertical clearance is or must be provided during flight operation.

OBSTACLE FREE ZONE- The OFZ is a three dimensional volume of airspace which protects for the transition of aircraft to and from the runway. The OFZ clearing standard precludes taxiing and parked airplanes and object penetrations, except for frangible NAVAID locations that are fixed by function. Additionally, vehicles, equipment, and personnel may be authorized by air traffic control to enter the area using the provisions of FAAO 7110.65, Para 3-1-5, *VEHICLES/EQUIPMENT/PERSONNEL ON RUNWAYS.* The runway OFZ and when applicable, the inner-approach OFZ, and the inner-transitional OFZ, comprise the OFZ.

a. Runway OFZ. The runway OFZ is a defined volume of airspace centered above the runway. The runway OFZ is the airspace above a surface whose elevation at any point is the same as the elevation of the nearest point on the runway centerline. The runway OFZ extends 200 feet beyond each end of the runway. The width is as follows:

1. For runways serving large airplanes, the greater of:

(a) 400 feet, or

(b) 180 feet, plus the wingspan of the most demanding airplane, plus 20 feet per 1,000 feet of airport elevation.

2. For runways serving only small airplanes:

(a) 300 feet for precision instrument runways.

(b) 250 feet for other runways serving small airplanes with approach speeds of 50 knots, or more.

(c) 120 feet for other runways serving small airplanes with approach speeds of less than 50 knots.

b. Inner-approach OFZ. The inner-approach OFZ is a defined volume of airspace centered on the approach area. The inner-approach OFZ applies only to runways with an approach lighting system. The inner-approach OFZ begins 200 feet from the runway threshold at the same elevation as the runway threshold and extends 200 feet beyond the last light unit in the approach lighting system. The width of the inner-approach OFZ is the same as the runway OFZ and rises at a slope of 50 (horizontal) to 1 (vertical) from the beginning.

c. Inner-transitional OFZ. The inner transitional surface OFZ is a defined volume of airspace along the sides of the runway and inner-approach OFZ and applies only to precision instrument runways. The inner-transitional surface OFZ slopes 3 (horizontal) to 1 (vertical) out from the edges of the runway OFZ and inner-approach OFZ to a height of 150 feet above the established airport elevation.

(Refer to AC 150/5300-13, Chapter 3.)

(Refer to FAAO 7110.65, Para 3-1-5, *VEHICLES/EQUIPMENT/PERSONNEL ON RUNWAYS.*)

OBSTRUCTION- Any object/obstacle exceeding the obstruction standards specified by FAR Part 77, Subpart C.

OBSTRUCTION LIGHT- A light or one of a group of lights, usually red or white, frequently mounted on a surface structure or natural terrain to warn pilots of the presence of an obstruction.

OCEANIC AIRSPACE- Airspace over the oceans of the world, considered international airspace, where oceanic separation and procedures per the International Civil Aviation Organization are applied. Responsibility for the provisions of air traffic control service in this airspace is delegated to various countries, based generally upon geographic proximity and the availability of the required resources.

OCEANIC DISPLAY AND PLANNING SYSTEM- An automated digital display system which provides flight data processing, conflict probe, and situation display for oceanic air traffic control.

OCEANIC NAVIGATIONAL ERROR REPORT- A report filed when an aircraft exiting oceanic airspace has been observed by radar to be off course. ONER reporting parameters and procedures are contained in FAAO 7110.82, Monitoring of Navigational Performance In Oceanic Areas.

OCEANIC PUBLISHED ROUTE- A route established in international airspace and charted or described in flight information publications, such as Route

Charts, DOD Enroute Charts, Chart Supplements, NOTAM's, and Track Messages.

OCEANIC TRANSITION ROUTE- An ATS route established for the purpose of transitioning aircraft to/from an organized track system.

ODAPS-
(See OCEANIC DISPLAY AND PLANNING SYSTEM.)

OFF COURSE- A term used to describe a situation where an aircraft has reported a position fix or is observed on radar at a point not on the ATC-approved route of flight.

OFFSHORE/CONTROL AIRSPACE AREA- That portion of airspace between the U.S. 12 NM limit and the oceanic CTA/FIR boundary within which air traffic control is exercised. These areas are established to provide air traffic control services. Offshore/Control Airspace Areas may be classified as either Class A airspace or Class E airspace.

OFF-ROUTE VECTOR- A vector by ATC which takes an aircraft off a previously assigned route. Altitudes assigned by ATC during such vectors provide required obstacle clearance.

OFFSET PARALLEL RUNWAYS- Staggered runways having centerlines which are parallel.

OFT-
(See OUTER FIX TIME.)

OM-
(See OUTER MARKER.)

OMEGA- An RNAV system designed for long-range navigation based upon ground-based electronic navigational aid signals.

ONE-MINUTE WEATHER- The most recent one minute updated weather broadcast received by a pilot from an uncontrolled airport ASOS/AWOS.

ONER-
(See OCEANIC NAVIGATIONAL ERROR REPORT.)

OPERATIONAL-
(See DUE REGARD.)

ON COURSE-

a. Used to indicate that an aircraft is established on the route centerline.

b. Used by ATC to advise a pilot making a radar approach that his aircraft is lined up on the final approach course.
(See ON-COURSE INDICATION-COURSE INDICATION.)

ON-COURSE INDICATION- An indication on an instrument, which provides the pilot a visual means of determining that the aircraft is located on the centerline of a given navigational track, or an indication on a radar scope that an aircraft is on a given track.

OPPOSITE DIRECTION AIRCRAFT- Aircraft are operating in opposite directions when:

a. They are following the same track in reciprocal directions; or

b. Their tracks are parallel and the aircraft are flying in reciprocal directions; or

c. Their tracks intersect at an angle of more than 135°.

OPTION APPROACH- An approach requested and conducted by a pilot which will result in either a touch-and-go, missed approach, low approach, stop-and-go, or full stop landing.
(See CLEARED FOR THE OPTION.)
(Refer to AIM.)

ORGANIZED TRACK SYSTEM- A movable system of oceanic tracks that traverses the North Atlantic between Europe and North America the physical position of which is determined twice daily taking the best advantage of the winds aloft.

ORGANIZED TRACK SYSTEM- A series of ATS routes which are fixed and charted; i.e., CEP, NOPAC, or flexible and described by NOTAM; i.e., NAT TRACK MESSAGE.

OROCA- An off-route altitude which provides obstruction clearance with a 1,000 foot buffer in non-mountainous terrain areas and a 2,000 foot buffer in designated mountainous areas within the United States. This altitude may not provide signal coverage from ground-based navigational aids, air traffic control radar, or communications coverage.

OTR-
(See OCEANIC TRANSITION ROUTE.)

OTS-
(See ORGANIZED TRACK SYSTEM.)

OUT- The conversation is ended and no response is expected.

OUTER AREA (associated with Class C airspace)- Nonregulatory airspace surrounding designated Class

traffic. Usually under the direct supervision of an assistant manager for traffic management.

TRAFFIC NO FACTOR- Indicates that the traffic described in a previously issued traffic advisory is no factor.

TRAFFIC NO LONGER OBSERVED- Indicates that the traffic described in a previously issued traffic advisory is no longer depicted on radar, but may still be a factor.

TRAFFIC PATTERN- The traffic flow that is prescribed for aircraft landing at, taxiing on, or taking off from an airport. The components of a typical traffic pattern are upwind leg, crosswind leg, downwind leg, base leg, and final approach.

a. Upwind Leg- A flight path parallel to the landing runway in the direction of landing.

b. Crosswind Leg- A flight path at right angles to the landing runway off its upwind end.

c. Downwind Leg- A flight path parallel to the landing runway in the direction opposite to landing. The downwind leg normally extends between the crosswind leg and the base leg.

d. Base Leg- A flight path at right angles to the landing runway off its approach end. The base leg normally extends from the downwind leg to the intersection of the extended runway centerline.

e. Final Approach. A flight path in the direction of landing along the extended runway centerline. The final approach normally extends from the base leg to the runway. An aircraft making a straight-in approach VFR is also considered to be on final approach.

(See STRAIGHT-IN APPROACH VFR.)

(See TAXI PATTERNS.)

(Refer to AIM.)

(Refer to FAR Part 91.)

(See ICAO term AERODROME TRAFFIC CIRCUIT.)

TRAFFIC SITUATION DISPLAY (TSD)- TSD is a computer system that receives radar track data from all 20 CONUS ARTCC's, organizes this data into a mosaic display, and presents it on a computer screen. The display allows the traffic management coordinator multiple methods of selection and highlighting of individual aircraft or groups of aircraft. The user has the option of superimposing these aircraft positions over any number of background displays. These background options include ARTCC boundaries, any stratum of en route sector boundaries, fixes, airways, military and other special use airspace, airports, and geopolitical boundaries. By using the TSD, a coordinator can monitor any number of traffic situations or the entire systemwide traffic flows.

TRANSCRIBED WEATHER BROADCAST- A continuous recording of meteorological and aeronautical information that is broadcast on L/MF and VOR facilities for pilots.

(Refer to AIM.)

TRANSFER OF CONTROL- That action whereby the responsibility for the separation of an aircraft is transferred from one controller to another.

(See ICAO term TRANSFER OF CONTROL.)

TRANSFER OF CONTROL [ICAO]- Transfer of responsibility for providing air traffic control service.

TRANSFERRING CONTROLLER- A controller/facility transferring control of an aircraft to another controller/facility.

(See ICAO term TRANSFERRING UNIT/CONTROLLER.)

TRANSFERRING FACILITY-

(See TRANSFERRING CONTROLLER.)

TRANSFERRING UNIT/CONTROLLER [ICAO]- Air traffic control unit/air traffic controller in the process of transferring the responsibility for providing air traffic control service to an aircraft to the next air traffic control unit/air traffic controller along the route of flight.

Note: See definition of accepting unit/controller.

TRANSITION-

a. The general term that describes the change from one phase of flight or flight condition to another; e.g., transition from en route flight to the approach or transition from instrument flight to visual flight.

b. A published procedure (DP Transition) used to connect the basic DP to one of several en route airways/jet routes, or a published procedure (STAR Transition) used to connect one of several en route airways/jet routes to the basic STAR.

(Refer to DP/STAR Charts.)

TRANSITIONAL AIRSPACE- That portion of controlled airspace wherein aircraft change from one phase of flight or flight condition to another.

TRANSITION POINT- A point at an adapted number of miles from the vertex at which an arrival aircraft would normally commence descent from its en route

altitude. This is the first fix adapted on the arrival speed segments.

TRANSMISSOMETER- An apparatus used to determine visibility by measuring the transmission of light through the atmosphere. It is the measurement source for determining runway visual range (RVR) and runway visibility value (RVV).

(See VISIBILITY.)

TRANSMITTING IN THE BLIND- A transmission from one station to other stations in circumstances where two-way communication cannot be established, but where it is believed that the called stations may be able to receive the transmission.

TRANSPONDER- The airborne radar beacon receiver/transmitter portion of the Air Traffic Control Radar Beacon System (ATCRBS) which automatically receives radio signals from interrogators on the ground, and selectively replies with a specific reply pulse or pulse group only to those interrogations being received on the mode to which it is set to respond.

(See INTERROGATOR.)

(Refer to AIM.)

(See ICAO term TRANSPONDER.)

TRANSPONDER [ICAO]- A receiver/transmitter which will generate a reply signal upon proper interrogation; the interrogation and reply being on different frequencies.

TRANSPONDER CODES-

(See CODES.)

TRSA-

(See TERMINAL RADAR SERVICE AREA.)

TSD-

(See TRAFFIC SITUATION DISPLAY.)

TURBOJET AIRCRAFT- An aircraft having a jet engine in which the energy of the jet operates a turbine which in turn operates the air compressor.

TURBOPROP AIRCRAFT- An aircraft having a jet engine in which the energy of the jet operates a turbine which drives the propeller.

TURN ANTICIPATION- (maneuver anticipation).

TVOR-

(See TERMINAL-VERY HIGH FREQUENCY OMNIDIRECTIONAL RANGE STATION.)

TWEB-

(See TRANSCRIBED WEATHER BROADCAST.)

TWO-WAY RADIO COMMUNICATIONS FAILURE-

(See LOST COMMUNICATIONS.)

W

WA-
(See AIRMET.)
(See WEATHER ADVISORY.)

WAKE TURBULENCE- Phenomena resulting from the passage of an aircraft through the atmosphere. The term includes vortices, thrust stream turbulence, jet blast, jet wash, propeller wash, and rotor wash both on the ground and in the air.
(See AIRCRAFT CLASSES.)
(See JET BLAST.)
(See VORTICES.)
(Refer to AIM.)

WARNING AREA-
(See SPECIAL USE AIRSPACE.)

WASS-
(See WIDE-AREA AUGMENTATION SYSTEM.)

WAYPOINT- A predetermined geographical position used for route/instrument approach definition, progress reports, published VFR routes, visual reporting points or points for transitioning and/or circumnavigating controlled and/or special use airspace, that is defined relative to a VORTAC station or in terms of latitude/longitude coordinates.

WEATHER ADVISORY- In aviation weather forecast practice, an expression of hazardous weather conditions not predicted in the area forecast, as they affect the operation of air traffic and as prepared by the NWS.
(See SIGMET.)
(See AIRMET.)

WHEN ABLE- When used in conjunction with ATC instructions, gives the pilot the latitude to delay compliance until a condition or event has been reconciled. Unlike "pilot discretion," when instructions are prefaced "when able," the pilot is expected to seek the first opportunity to comply. Once a maneuver has been initiated, the pilot is expected to continue until the specifications of the instructions have been met. "When able," should not be used when expeditious compliance is required.

WIDE-AREA AUGMENTATION SYSTEM (WAAS)- The WAAS is a satellite navigation system consisting of the equipment and software which augments the GPS Standard Positioning Service (SPS). The WAAS provides enhanced integrity, accuracy, availability, and continuity over and above GPS SPS. The differential correction function provides improved accuracy required for precision approach.

WILCO- I have received your message, understand it, and will comply with it.

WIND SHEAR- A change in wind speed and/or wind direction in a short distance resulting in a tearing or shearing effect. It can exist in a horizontal or vertical direction and occasionally in both.

WING TIP VORTICES-
(See VORTICES.)

WORDS TWICE-

a. As a request: "Communication is difficult. Please say every phrase twice."

b. As information: "Since communications are difficult, every phrase in this message will be spoken twice."

WORLD AERONAUTICAL CHARTS-
(See AERONAUTICAL CHART.)

WS-
(See SIGMET.)
(See WEATHER ADVISORY.)

WST-
(See CONVECTIVE SIGMET.)
(See WEATHER ADVISORY.)

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BRIEFING GUIDE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

Initiated By: ATP-100

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2. BACKGROUND: Due to the advent of new terminal automation systems, such as Standard Terminal Automation Replacement System (STARS) and ARTS Color Display (ACD), numerous editorial changes, abbreviations, and new procedures are required.

3. CHANGE:

OLD

1-2-6. ABBREVIATIONS

Abbreviations	*Meaning*
Add	Add
AMB	Ambiguity-A disparity greater than 2 miles exists between the position declared for a target by ARTS and another facility's computer declared position during interfacility handoff
Add	Add
Add	Add
Add	Add
Add	Add
Add	Add
Add	Add
Add	Add

TBL 1-2-1

NEW

1-2-6. ABBREVIATIONS

Abbreviations	*Meaning*
AMASS	**Airport Movement Area Safety System**
AMB	Ambiguity - A disparity greater than 2 miles exists between the position declared for a target by ATTS and another facility's computer declared position during interfacility handoff
ARTS	**Automated Radar Tracking System**
ATTS	**Automated Terminal Tracking Systems**
CPME	**Calibration Performance Monitor Equipment**
CTRD	**Certified Tower Radar Display**
EDCT	**Expect Departure Clearance Time**
M-EARTS	**Micro-En Route Automated Radar Tracking System**
RTQC	**Real-Time Quality Control**

TBL 1-2-1

OLD	NEW
2-6-4. WEATHER AND CHAFF SERVICES	**2-6-4. WEATHER AND CHAFF SERVICES**
a. Issue pertinent information on observed/reported weather or chaff areas. Provide radar navigational guidance and/or approve deviations around weather or chaff areas when requested by the pilot. Do not use the word "turbulence" in describing radar-derived weather.	No Change
1. Issue weather and chaff information by defining the area of coverage in terms of azimuth (by referring to the 12-hour clock) and distance from the aircraft or by indicating the general width of the area and the area of coverage in terms of fixes or distance and direction from fixes.	No Change
2. Issue the level of echo intensity when that information is available. When utilizing ASR-9 radar equipment, controllers shall ensure that the highest available level of echo intensity within their area of jurisdiction is displayed.	**2.** Issue the level of echo intensity when that information is available.
Add	**3. When equipment limitations exist, controllers shall, at a minimum, ensure that the highest available level of echo intensity within their area of jurisdiction is displayed.**
3. When a deviation cannot be approved as requested and the situation permits, suggest an alternative course of action.	**4.** When a deviation cannot be approved as requested and the situation permits, suggest an alternative course of action.
b. In areas of significant weather, plan ahead and be prepared to suggest, upon pilot request, the use of alternative routes/altitudes.	No Change
NOTE- *Weather significant to the safety of aircraft includes such conditions as tornadoes, lines of thunderstorms, embedded thunderstorms, large hail, wind shear, moderate to extreme turbulence (including CAT), and light to severe icing.*	No Change
c. Inform any tower for which you provide approach control services if you observe any weather echoes on radar which might affect their operations.	No Change
PHRASEOLOGY-	***PHRASEOLOGY-***
WEATHER/CHAFF AREA BETWEEN (number) O'CLOCK AND (number) O'CLOCK (number) MILES,	No Change
or	
(number) MILE BAND OF WEATHER/CHAFF FROM (fix or number of miles and direction from fix) TO (fix or number of miles and direction from fix),	No Change
or	

LEVEL (number) WEATHER ECHO BETWEEN (number) O'CLOCK AND (number) O'CLOCK, (number) MILES. MOVING (direction) AT (number) KNOTS, TOPS (altitude),

or

DEVIATION APPROVED, (restrictions if necessary), ADVISE WHEN ABLE TO:

RETURN TO COURSE,

or

RESUME OWN NAVIGATION

or

FLY HEADING (heading)

or

PROCEED DIRECT TO (name of NAVAID).
UNABLE DEVIATION (state possible alternate course of action).

EXAMPLE-

1. *"Level five weather echo between eleven o'clock and one o'clock, one zero miles. Moving east at two zero knots, tops flight level three niner zero."*

2. *"Level four weather echo between ten o'clock and two o'clock, one five miles. Weather area is two five miles in diameter."*

Add

Add

NOTE-
Phraseology using level number is only applicable when the radar weather echo intensity information is determined by NWS radar equipment or ASR-9 radar equipment.

REFERENCE-
P/CG Term- Radar Weather Echo Intensity Levels.

d. The supervisory traffic management coordinator-in-charge/operations supervisor/controller-in-charge shall verify the ASR-9 weather information by the best means available (e.g., pilot reports, local tower personnel, etc.) if the weather data displayed by the ASR-9 is reported as questionable or erroneous. Errors in weather radar presentation shall be reported to the AF technician and the AT supervisor shall determine if the ASR-9 derived weather data is to be displayed and a NOTAM distributed.

LEVEL (number(s)) WEATHER ECHO BETWEEN (number) O'CLOCK AND (number) O'CLOCK, (number) MILES. MOVING (direction) AT (number) KNOTS, TOPS (altitude),

No Change

No Change

No Change

No Change

EXAMPLE-

No Change

No Change

3. ***"Level four and five weather echoes between ten o'clock and two o'clock, one five miles. Weather area is two five miles in diameter."***

4. ***"Level two through four weather echoes between ten o'clock and two o'clock, one five miles. Weather area is two five miles in diameter."***

NOTE-
Phraseology using level number(s) is only applicable when the radar weather echo intensity information is determined by NWS radar equipment or ***digitized*** *radar equipment.*

No Change

d. The supervisory traffic management coordinator-in-charge/operations supervisor/controller-in-charge shall verify the **digitized radar** weather information by the best means available (e.g., pilot reports, local tower personnel, etc.) if the weather data displayed by **digitized radar** is reported as questionable or erroneous. Errors in weather radar presentation shall be reported to the AF technician and the AT supervisor shall determine if the **digitized radar** derived weather data is to be displayed and a NOTAM distributed.

OLD

3-1-6. TRAFFIC INFORMATION

a through **b** ***EXAMPLE***

c. When using a certified tower radar display, you may issue traffic advisories using the standard radar phraseology prescribed in para 2-1-21, Traffic Advisories.

NEW

3-1-6. TRAFFIC INFORMATION

No Change

c. When using a **CTRD**, you may issue traffic advisories using the standard radar phraseology prescribed in para 2-1-21, Traffic Advisories.

OLD

3-9-10. CANCELLATION OF TAKEOFF CLEARANCE

Cancel a previously issued clearance for takeoff and inform the pilot of the reason if circumstances require. Once an aircraft has started takeoff roll, cancel the takeoff clearance only for the purpose of safety.

NOTE-
In no case should a takeoff clearance be canceled after an aircraft has started its takeoff roll solely for the purpose of meeting traffic management requirements/EDC times.

NEW

3-9-10. CANCELLATION OF TAKEOFF CLEARANCE

No Change

NOTE-
In no case should a takeoff clearance be canceled after an aircraft has started its takeoff roll solely for the purpose of meeting traffic management requirements/EDCT.

OLD

3-10-7. LANDING CLEARANCE WITHOUT VISUAL OBSERVATION

When an arriving aircraft reports at a position where he/she should be seen but has not been visually observed, advise the aircraft as a part of the landing clearance that it is not in sight and restate the landing runway.

PHRASEOLOGY-
NOT IN SIGHT, RUNWAY (number) CLEARED TO LAND.

NOTE-
Aircraft observance on the BRITE/DBRITE/TDW display satisfies the visually observed requirement.

NEW

3-10-7. LANDING CLEARANCE WITHOUT VISUAL OBSERVATION

No Change

No Change

NOTE-
Aircraft observance on the CTRD satisfies the visually observed requirement.

OLD	NEW
4-3-9. FORWARDING DEPARTURE TIMES	**4-3-9. FORWARDING DEPARTURE TIMES**
TERMINAL	No Change
Unless alternate procedures are prescribed in a letter of agreement or automatic departure messages are being transmitted between automated facilities, forward departure times to the facility from which you received the clearance and also to the terminal departure controller when that position is involved in the departure sequence.	
NOTE- **1.** *Letters of agreement prescribing assumed departure times or mandatory radar handoff procedures are alternatives for providing equivalent procedures.*	No Change
2. *The letters "DM" flashing in field 4 of the full data block signify unsuccessful transmission of an automatic departure message.*	**2.** *The letters "DM" flashing in the data block signify unsuccessful transmission of a departure message.*

OLD	NEW
4-7-11. ARRIVAL INFORMATION BY APPROACH CONTROL FACILITIES	**4-7-11. ARRIVAL INFORMATION BY APPROACH CONTROL FACILITIES**
Title through **a6** ***NOTE***	No Change
b. Forward the following information to the tower when the tower and TRACON are part of the same facility:	No Change
1. Aircraft identification.	No Change
2. Type aircraft if required for separation purposes.	No Change
3. Type of instrument approach procedure and/or runway if differing from that in use.	No Change
NOTE- *The local controller has the responsibility to determine whether or not conditions are adequate for the use of ARTS/STARS data on the BRITE/DBRITE/TDW where a facility directive authorizes its use for the transfer of arrival data.*	***NOTE-*** *The local controller has the responsibility to determine whether or not conditions are adequate for the use of ATTS data on the CTRD where a facility directive authorizes its use for the transfer of arrival data.*
REFERENCE- *FAAO 7210.3, Use of ARTS Modify and Quick Look Functions, Para 11-2-4.* *FAAO 7210.3, Use of STARS Quick Look Functions, Para 11-8-4.*	***REFERENCE-*** *FAAO 7210.3, Use of Modify and Quick Look Functions, Para 11-2-4.*
	No Change

c. Where the collocated or satellite tower has ARTS/STARS data displayed on its BRITE/DBRITE/TDW, the ARTS/STARS modify or quick look functions may be used to forward arrival data provided that a facility directive at the collocated tower or a letter of agreement with the satellite tower exists which outlines procedures for using ARTS/STARS for transferring this data.

c. Where the collocated or satellite tower has **ATTS** data displayed on its **CTRD**, the **ATTS** modify or quick look functions may be used to forward arrival data provided that a facility directive at the collocated tower or a letter of agreement with the satellite tower exists which outlines procedures for using **ATTS** for transferring this data.

OLD

5-1-3. RADAR USE

Use radar information derived from primary and Mode 3/A secondary radar systems.

REFERENCE-
FAAO 7110.65, Beacon Range Accuracy, Para 5-1-4.
FAAO 7110.65, Inoperative or Malfunctioning Interrogator, Para 5-2-15.

a. Secondary radar may be used as the sole display source as follows:

1. In Class A airspace.

REFERENCE-
FAAO 7110.65, Failed Transponder in Class A Airspace, Para 5-2-16.
14 CFR Section 91.135, Operations in Class A Airspace.

2. Outside Class A airspace, or where mix of Class A airspace/non-Class A airspace exists, only when:

(a) Additional coverage is provided by secondary radar beyond that of the primary radar.

(b) The primary radar is temporarily unusable or out of service. Advise pilots when these conditions exist.

PHRASEOLOGY-
PRIMARY RADAR OUT OF SERVICE. RADAR TRAFFIC ADVISORIES AVAILABLE ON TRANSPONDER AIRCRAFT ONLY.

NOTE-
1. *Advisory may be omitted when provided on ATIS and pilot indicates having ATIS information.*

2. *Advisory may be omitted in the en route environment when there is overlapping primary radar coverage from multiple radar sites.*

(c) *EN ROUTE.* A secondary radar system is the only source of radar data for the area of service. When the system is used for separation, beacon range accuracy is assured, as provided in para 5-1-4, Beacon Range Accuracy.

NEW

5-1-3. RADAR USE

Use radar information derived from primary and secondary radar systems.

No Change

No Change

No Change

No Change

No Change

No Change

No Change

No Change

No Change

2. *Advisory may be omitted when there is overlapping primary radar coverage from multiple radar sites.*

(c) A secondary radar system is the only source of radar data for the area of service. When the system is used for separation, beacon range accuracy is assured, as provided in para 5-1-4, Beacon Range Accuracy.

NOTE-
This provision is to authorize secondary radar only operations where there is no primary radar available and the condition is not temporary.

Add

b. *TERMINAL.* Do not use only secondary radar to conduct surveillance (ASR) final approaches unless an emergency exists and the pilot concurs.

NOTE-
1. *This provision is to authorize secondary radar only operations where there is no primary radar available and the condition is not temporary.*

2. Since Terminal facilities use Long Range Radar, this is applicable to En Route and Terminal Radar Facilities.

b. *TERMINAL.* Do not use secondary radar to conduct surveillance (ASR) final approaches unless **the system is fully digitized, or** an emergency exists and the pilot concurs.

OLD

5-2-2. DISCRETE ENVIRONMENT

a. Issue discrete beacon codes assigned by the computer. Computer-assigned codes may be modified as required.

1. *TERMINAL.* Aircraft that will remain within the terminal facility's delegated airspace shall be assigned a code from the code subset allocated to the terminal facility.

2. *TERMINAL.* Unless otherwise specified in a facility directive or a letter of agreement, aircraft that will enter an adjacent ARTS/STARS facility's delegated airspace shall be assigned a beacon code assigned by the ARTCC computer.

NEW

5-2-2. DISCRETE ENVIRONMENT

No Change

No Change

2. *TERMINAL.* Unless otherwise specified in a facility directive or a letter of agreement, aircraft that will enter an adjacent **ATTS** facility's delegated airspace shall be assigned a beacon code assigned by the ARTCC computer.

OLD

5-2-13. CODE MONITOR

Continuously monitor the Mode 3/A radar beacon codes assigned for use by aircraft operating within your area of responsibility when nonautomated beacon decoding equipment (e.g., 10-channel decoder) is used to display the target symbol.

REFERENCE-
FAAO 7110.65, Function Code Assignments, Para 5-2-6.

NOTE-
In addition to alphanumeric and control symbology processing enhancements, the ARTS, EARTS, and the TPX-42 systems are equipped with automatic beacon decoders. Therefore, in facilities where the automatic beacon decoders are providing the control slash video, there is no requirement to have the nonautomated decoding equipment operating simultaneously.

NEW

5-2-13. CODE MONITOR

No Change

No Change

NOTE-
*In addition to alphanumeric and control symbology processing enhancements, the **M-EARTS, STARS,** and the TPX-42 systems are equipped with automatic beacon decoders. Therefore, in facilities where the automatic beacon decoders are providing the control slash video, there is no requirement to have the nonautomated decoding equipment operating simultaneously.*

4. OPERATIONAL IMPACT: None.

1. PARAGRAPH NUMBER AND TITLE: 2-1-5. EXPEDITIOUS COMPLIANCE

2. BACKGROUND: The Air Traffic Procedures Advisory Committee (ATPAC) identified this as an area of concern.

3. CHANGE:

OLD	NEW
2-1-5. EXPEDITIOUS COMPLIANCE	**2-1-5. EXPEDITIOUS COMPLIANCE**
a. Use the word "immediately" only when expeditious compliance is required to avoid an imminent situation.	No Change
b. Use the word "expedite" only when prompt compliance is required to avoid the development of an imminent situation.	**b.** Use the word "expedite" only when prompt compliance is required to avoid the development of an imminent situation. **If an "expedite" climb or descent clearance is issued by ATC, and subsequently the altitude to maintain is changed or restated without an expedite instruction, the expedite instruction is canceled.**
c. In either case, if time permits, include the reason for this action.	No Change

4. OPERATIONAL IMPACT: Minimal.

---

1. PARAGRAPH NUMBER AND TITLE: 2-1-10. NAVAID MALFUNCTIONS

2. BACKGROUND: Recent events concerning GPS anomalies dictate the need for procedures to report such events. These procedures evolve as the system matures. Information gathering identifies new situations and new dimensions of outage areas.

3. CHANGE:

OLD	NEW
2-1-10. NAVAID MALFUNCTIONS	**2-1-10. NAVAID MALFUNCTIONS**
a1 through **a5**	No Change
b. When an aircraft reports a GPS/GNSS anomaly, request the following information and/or take the following actions:	**b.** When an aircraft reports a GPS/GNSS anomaly, request the following information and/or take the following actions:
1. Date and time of the occurrence.	Delete
2. Location of anomaly.	Delete
3. Altitude.	Delete
4. Aircraft type and call sign.	Delete
5. GPS receiver (make and model) or FMS that uses GPS sensors.	Delete
6. Aircraft attitude.	Delete
7. Other information.	Delete
8. Attempt to identify other GPS aircraft in the area experiencing the anomaly.	Delete

9. Forward this information to the local AF personnel.	Delete
10. Broadcast the anomaly report to other aircraft as necessary.	Delete
Add	**1. Record the following minimum information:**
Add	**(a) Aircraft call sign.**
Add	**(b) Location.**
Add	**(c) Altitude.**
Add	**(d) Date/time of occurrence.**
Add	**2. Direct the aircraft to file a complete report with AFSS/FSS.**
Add	**3. Broadcast the anomaly report to other aircraft as necessary.**
NOTE- *1-4 are considered essential information. Obtain 5-7 whenever possible. Actions 8-10 are mandatory.*	Delete

4. OPERATIONAL IMPACT: This change realigns GPS reporting procedures.

---

1. PARAGRAPH NUMBER AND TITLE: 2-9-2. OPERATING PROCEDURES and 2-9-3. CONTENT

2. BACKGROUND: References to weather in these paragraphs are not in accordance with the METAR format. These are editorial changes to eliminate the possibility of confusion.

3. CHANGE:

OLD	NEW
2-9-2. OPERATING PROCEDURES	**2-9-2. OPERATING PROCEDURES**
Title through **c**	No Change
d. Controllers shall ensure that pilots receive the most current pertinent information. Ask the pilot to confirm receipt of the current ATIS information if the pilot does not initially state the appropriate ATIS code. Controllers shall ensure that changes to pertinent operational information is provided after the initial confirmation of ATIS information is established. Issue the current weather, runway in use, approach information, and pertinent NOTAM's to pilots who are unable to receive the ATIS.	No Change
EXAMPLE-	***EXAMPLE-***
"Verify you have information ALPHA."	No Change
"Information BRAVO now current, visibility three miles."	No Change
"Information CHARLIE now current, Measured Ceiling 1500 Broken."	*"Information CHARLIE now current, Ceiling 1500 Broken."*

OLD

2-9-3. CONTENT

Include the following in ATIS broadcast as appropriate:

a. Airport/facility name, phonetic letter code, time of weather sequence (UTC). Weather information consisting of ceiling, visibility, obstructions to vision, temperature, dew point, wind direction and velocity, altimeter, a density altitude advisory when appropriate, and other pertinent remarks included in the official weather observation. Wind direction, velocity, and altimeter shall be reported from certified direct reading instruments. Temperature and dew point should be reported from certified direct reading sensors when available. Always include weather observation remarks of lightning, cumulonimbus, and towering cumulus clouds.

NEW

2-9-3. CONTENT

Include the following in ATIS broadcast as appropriate:

a. Airport/facility name, phonetic letter code, time of weather sequence (UTC). Weather information consisting of **wind direction and velocity, visibility, obstructions to vision, present weather, sky condition, temperature, dew point,** altimeter, a density altitude advisory when appropriate and other pertinent remarks included in the official weather observation. Wind direction, velocity, and altimeter shall be reported from certified direct reading instruments. Temperature and dew point should be reported from certified direct reading sensors when available. Always include weather observation remarks of lightning, cumulonimbus, and towering cumulus clouds.

4. OPERATIONAL IMPACT: Minimal.

---

1. PARAGRAPH NUMBER AND TITLE: 3-6-1. EQUIPMENT USAGE

2. BACKGROUND: Development of the Airport Movement Area Safety System (AMASS) and its integration into current airport surface detection equipment (ASDE) requires procedural changes for air traffic personnel.

3. CHANGE:

OLD

3-6-1. EQUIPMENT USAGE

Use ASDE to augment visual observation of aircraft and/or vehicular movements on runways and taxiways, or other areas of the movement area:

a. When visibility is less than the most distant point in the active movement area, and

b. When, in your judgment, its use will assist you in the performance of your duties at any time.

c. ASDE-3 shall be operated continuously between sunset and sunrise regardless of visibility.

NEW

3-6-1. EQUIPMENT USAGE

a. ASDE/**AMASS shall be operated continuously** to augment visual observation of aircraft **landing or departing, and aircraft** or vehicular movements on runways and taxiways, or other areas of the movement area.

Delete

b. The operational status of ASDE/AMASS shall be determined during the relief briefing, or as soon as possible after assuming responsibility for the associated control position.

Delete

4. OPERATIONAL IMPACT: Operations are enhanced through use of ASDE/AMASS on a continuous basis.

1. PARAGRAPH NUMBER AND TITLE: 3-6-2. INFORMATION USAGE; 3-6-3. IDENTIFICATION; and 3-6-4. AMASS ALERT RESPONSES

2. BACKGROUND: Development of the Airport Movement Area Safety System (AMASS) and its integration into current airport surface detection equipment (ASDE) requires procedural changes for air traffic personnel.

3. CHANGE:

OLD

3-6-2. INFORMATION USAGE

a. Use ASDE derived information to assist with:

1. Formulating clearances and control instructions to aircraft and vehicles on the movement area.

2. Determining when the runway is clear of aircraft and vehicles prior to a landing or departure.

REFERENCE-
FAAO 7210.3, Radar Use, Para 3-7-2.

3. Positioning aircraft and vehicles using the movement area.

4. Determining the exact location of aircraft and vehicles, or spatial relationship to other aircraft/vehicles on the movement area.

5. Monitoring compliance with control instructions by aircraft and vehicles on taxiways and runways.

6. Confirming pilot reported positions.

7. Providing directional taxi information on pilot request.

NEW

3-6-2. INFORMATION USAGE

a. ASDE/AMASS derived information may be used to:

1. Formulate clearances and control instructions to aircraft.

2. Formulate control instructions to vehicles on the movement area.

REFERENCE-
FAAO 7210.3, Radar Use, Para 3-7-2b2.

3. Position aircraft and vehicles using the movement area.

4. Determine the exact location of aircraft and vehicles, or spatial relationship to other aircraft/vehicles on the movement area.

5. Monitor compliance with control instructions by aircraft and vehicles on taxiways and runways.

6. Confirm pilot reported positions.

7. Provide directional taxi information, **as appropriate**.

OLD

3-6-3. IDENTIFICATION

To identify an observed target on the ASDE display, correlate its position with one or more of the following:

a. Pilot's report.

NEW

3-6-3. IDENTIFICATION

To identify an observed target on the ASDE/AMASS display, correlate its position with one or more of the following:

a. Pilot position report.

OLD	NEW
Add	**3-6-4. AMASS ALERT RESPONSES**
Add	**When the system alarms, the controller shall immediately assess the situation visually and as presented on the ASDE/AMASS display, then take appropriate action, as follows:**
Add	**a. When an arrival aircraft (still airborne, prior to the landing threshold) activates an alarm, the controller shall issue go-around instructions. (Exception: Alarms involving known formation flights, as they cross the landing threshold, may be disregarded if all other factors are acceptable.)**
Add	**b. For other AMASS alarms, issue instructions/ clearances based on good judgment and evaluation of the situation at hand.**

4. OPERATIONAL IMPACT: None.

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1. PARAGRAPH NUMBER AND TITLE: 3-7-5. PRECISION APPROACH CRITICAL AREA

2. BACKGROUND: This change clarifies the intent of FAAO 7110.65M, paragraph 3-7-5. This paragraph requires that access to the ILS/MLS critical area must be controlled to ensure the integrity of the ILS/MLS course signals whenever conditions are "less than reported ceiling 800 feet and/or visibility less than 2 miles."

3. CHANGE:

OLD	NEW
3-7-5. PRECISION APPROACH CRITICAL AREA	**3-7-5. PRECISION APPROACH CRITICAL AREA**
Title through **a *PHRASEOLOGY-***	No Change
1. LOCALIZER CRITICAL AREA	**1.** LOCALIZER CRITICAL AREA
(a) Do not authorize vehicle or aircraft operations in or over the area when an arriving aircraft is inside the ILS OM or the fix used in lieu of the OM when conditions are less than reported ceiling 800 feet and/or visibility 2 miles, except:	**(a)** Do not authorize vehicle or aircraft operations in or over the area when an arriving aircraft is inside the ILS OM or the fix used in lieu of the OM when conditions are less than reported ceiling 800 feet and/or visibility less than 2 miles, except:

4. OPERATIONAL IMPACT: None.

1. PARAGRAPH NUMBER AND TITLE: 3-9-4. TAXI INTO POSITION AND HOLD (TIPH)

2. BACKGROUND: The National Transportation Safety Board (NTSB) has formally recommended to the FAA that we discontinue the practice of allowing departing aircraft to hold on active runways at nighttime or at any time when ceiling and visibility conditions preclude arriving aircraft from seeing traffic on the runway in time to initiate a safe go-around maneuver. As part of the recent Runway Safety National Summit, Administrator Garvey committed the FAA to modifying taxi into position and hold procedures.

3. CHANGE:

OLD	NEW
3-9-4. TAXI INTO POSITION AND HOLD (TIPH)	**3-9-4. TAXI INTO POSITION AND HOLD (TIPH)**
a through **d**	No Change
Add	**e. Do not authorize an aircraft to taxi into position and hold when the departure point is not visible from the tower, unless the aircraft's position can be verified by ASDE or the runway is used for departures only.**
e through **h**	Reletter **f** through **i**

4. OPERATIONAL IMPACT: None.

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1. PARAGRAPH NUMBER AND TITLE: 3-9-7. WAKE TURBULENCE SEPARATION FOR INTERSECTION DEPARTURES

2. BACKGROUND: There have been several interpretation requests on wake turbulence separation for intersection departures on parallel runways separated by less than 2,500 feet with runway thresholds offset by 500 feet or more. Currently, the paragraph could be interpreted to mean that parallel runways less than 2,500 feet apart are considered to be intersection departures regardless of offset or that the wake turbulence separation only applies if an aircraft is taking off from an actual intersection on the parallel runway. This change will clarify the application of wake turbulence separation for departures on parallel runways separated by less than 2,500 feet with runway thresholds offset by 500 feet or more.

3. CHANGE:

OLD	NEW
3-9-7. WAKE TURBULENCE SEPARATION FOR INTERSECTION DEPARTURES	**3-9-7. WAKE TURBULENCE SEPARATION FOR INTERSECTION DEPARTURES**
a. Apply the following wake turbulence criteria for intersection departures:	**a.** Apply the following wake turbulence criteria for intersection departures:
1. Separate a small aircraft taking off from an intersection on the same runway (same or opposite direction takeoff) behind a preceding departing large aircraft by ensuring that the small aircraft does not start takeoff roll until at least 3 minutes after the large aircraft has taken off.	**1.** Separate a small aircraft taking off from an intersection on the same runway (same or opposite direction takeoff) **or a parallel runway separated by less than 2,500 feet with runway thresholds offset by 500 feet or more** behind a preceding departing large aircraft by ensuring that the small aircraft does not start takeoff roll until at least 3 minutes after the large aircraft has taken off.

4. OPERATIONAL IMPACT: These changes shall be briefed to all operational personnel.

1. PARAGRAPH NUMBER AND TITLE: 3-10-9. RUNWAY EXITING

2. BACKGROUND: The Air Traffic Procedures Advisory Committee (ATPAC) identified this change as an area of concern due to the difference with pilots requirements to clear the applicable hold lines in order to be clear of the runway.

3. CHANGE:

OLD	NEW
3-10-9. RUNWAY EXITING	**3-10-9. RUNWAY EXITING**
Title through a *Note*	No Change
b. Taxi instructions shall be provided to the aircraft by the local controller when:	No Change
1. Compliance with ATC instructions will be required before the aircraft can change to ground control, or	No Change
2. The aircraft will be required to enter a taxiway/runway/ramp area, other than the one used to exit the landing runway, in order to taxi clear of the landing runway.	No Change
EXAMPLE- *"U.S. Air Ten Forty Two, turn right next taxiway, cross taxiway Bravo, hold short of taxiway Charlie, contact ground point seven."*	No Change
NOTE- **1.** *An aircraft is expected to taxi clear of the runway unless otherwise directed by ATC. Pilots shall not exit the landing runway on to an intersecting runway unless authorized by ATC. In the absence of ATC instructions, an aircraft should taxi clear of the landing runway even if that requires the aircraft to protrude into or enter another taxiway/ramp area. This does not authorize an aircraft to cross a subsequent taxiway or ramp after clearing the landing runway.*	***NOTE-*** **1.** *An aircraft is expected to taxi clear of the runway unless otherwise directed by ATC. Pilots shall not exit the landing runway on to an intersecting runway unless authorized by ATC. In the absence of ATC instructions, an aircraft should taxi clear of the landing runway* ***by clearing the hold position marking associated with the landing runway*** *even if that requires the aircraft to protrude into or enter another taxiway/ramp area. This does not authorize an aircraft to cross a subsequent taxiway or ramp after clearing the landing runway.*
2. *The pilot is responsible for ascertaining when the aircraft is clear of the runway.*	**2.** *The pilot is responsible for ascertaining when the aircraft is clear of the runway* ***by clearing the hold position marking associated with the landing runway.***

4. OPERATIONAL IMPACT: AXX-530 Branches should review with their Airport Managers, the applicable hold position lines, type aircraft arriving, length of taxiways, and what impact this may be to local procedures.

1. PARAGRAPH NUMBER AND TITLE: 4-5-7. ALTITUDE INFORMATION

2. BACKGROUND: The Air Traffic Procedures Advisory Committee (ATPAC) identified this as an area of concern.

3. CHANGE:

OLD	NEW
4-5-7. ALTITUDE INFORMATION	**4-5-7. ALTITUDE INFORMATION**
Title through g ***PHRASEOLOGY***	No Change
h. Instructions to vertically navigate on a STAR/FMPS with published restrictions.	No Change
PHRASEOLOGY- *DESCEND VIA (STAR/FMSP name and number).*	No Change
EXAMPLE- *"Descend via the Mudde One Arrival."* *"Cross JCT at flight level two four zero."* *"Descend via the Coast Two Arrival."*	***EXAMPLE-*** *"Descend via the Mudde One Arrival."* *"Cross JCT at flight level two four zero,* ***then*** *descend via the Coast Two Arrival."*

4. OPERATIONAL IMPACT: None.

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1. PARAGRAPH NUMBER AND TITLE: 4-6-4. HOLDING INSTRUCTIONS

2. BACKGROUND: Unlike conventional ground-based NAVAID's, GPS does not provide a radial, course, bearing, azimuth or route. GPS generates a track between waypoints. GPS is approved for use as a supplemental means of navigation and for use in lieu of ADF or DME. Holding instructions require updating to capture the use of a "track."

3. CHANGE:

OLD	NEW
4-6-4. HOLDING INSTRUCTIONS	**4-6-4. HOLDING INSTRUCTIONS**
When issuing holding instructions, specify:	No Change
a. Direction of holding from the fix.	**a.** Direction of holding from the fix/**waypoint**.
b. Holding fix.	**b.** Holding fix **or waypoint**.
NOTE- *The holding fix may be omitted if included at the beginning of the transmission as the clearance limit.*	No Change
c. Radial, course, bearing, azimuth, airway, or route on which the aircraft is to hold.	**c.** Radial, course, bearing, **track,** azimuth, airway, or route on which the aircraft is to hold.
d. Leg length in miles if DME or RNAV is to be used. Specify leg length in minutes if the pilot requests it or you consider it necessary.	No Change
e. Direction of holding pattern turns only if left turns are to be made, the pilot requests it, or you consider it necessary.	No Change

PHRASEOLOGY- *HOLD (direction) OF (fix) ON (specified radial, course, bearing, airway, azimuth(s), or route.)*	***PHRASEOLOGY-*** *HOLD (direction) OF (fix/**waypoint**) ON (specified radial, course, bearing, **track,** airway, azimuth(s), or route.)*
If leg length is specified, *(number of minutes/miles) MINUTE/MILE LEG.*	*If leg length is specified,* *(number of minutes/miles) MINUTE/MILE LEG.*
If direction of turn is specified, *LEFT/RIGHT TURNS.*	*If direction of turn is specified,* *LEFT/RIGHT TURNS.*

4. OPERATIONAL IMPACT: This change will allow GPS equipped aircraft to hold using GPS tracks.

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1. PARAGRAPH NUMBER AND TITLE: 5-1-2. ALIGNMENT CHECK

2. BACKGROUND: Adds the requirement to check the accuracy of the radar video display for digitized radar systems.

3. CHANGE:

OLD	NEW
5-1-2. ALIGNMENT CHECK	**5-1-2. ALIGNMENT ACCURACY CHECK**
Title through ***REFERENCE***	No Change
TERMINAL	*TERMINAL*
a. Check the alignment of the radar video display by assuring that the video map or overlay is properly aligned with a permanent target of known range and azimuth on the radar display. Where possible, check one permanent target per quadrant.	a. Check the alignment of the radar video display by assuring that the video/**digital** map or overlay is properly aligned with a permanent target of known range and azimuth on the radar display. Where possible, check one permanent target per quadrant.
b. Map alignment shall be verified for digitized radar systems by using the moving target indicator (MTI) reflectors, fixed location beacon transponders (Parrots), beacon real-time quality control (RTQC) symbols or calibration performance monitor equipment (CPME) beacon targets.	**b. Accuracy of the radar video display** shall be verified for digitized radar systems by using the moving target indicator (MTI) reflectors, fixed location beacon transponders (Parrots), beacon real-time quality control (RTQC) symbols or calibration performance monitor equipment (CPME) beacon targets.

4. OPERATIONAL IMPACT: None.

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1. PARAGRAPH NUMBER AND TITLE: 5-5-2. TARGET SEPARATION

2. BACKGROUND: Due to the advent of new terminal automation systems, such as Standard Terminal Automation Replacement System (STARS) and ARTS Color Display (ACD), the digital displays will be using digitized targets.

3. CHANGE:

OLD	NEW
5-5-2. TARGET SEPARATION	**5-5-2. TARGET SEPARATION**
Apply radar separation:	**a.** Apply radar separation:
a. Between the centers of primary radar targets; however, do not allow a primary target to touch another primary target or a beacon control slash.	**1.** Between the centers of primary radar targets; however, do not allow a primary target to touch another primary target or a beacon control slash.
b. Between the ends of beacon control slashes.	**2.** Between the ends of beacon control slashes.
NOTE- *At TPX-42 sites, the bracket video feature must be activated to display the beacon control slash.*	No Change
c. Between the end of a beacon control slash and the center of a primary target.	**3.** Between the end of a beacon control slash and the center of a primary target.
d. All-digital displays. Between the centers of digitized targets. Do not allow targets to touch.	**4.** All-digital displays. Between the centers of digitized targets. Do not allow **digitized** targets to touch.

4. OPERATIONAL IMPACT: None.

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1. PARAGRAPH NUMBER AND TITLE: 5-5-3. MINIMA

2. BACKGROUND: Due to the advent of new terminal automation systems, such as Standard Terminal Automation Replacement System (STARS) and ARTS Color Display (ACD), numerous editorial changes, abbreviations, and new procedures are required.

3. CHANGE:

OLD	NEW
5-5-3. MINIMA	**5-5-4. MINIMA**
Separate aircraft by the following minima:	No Change
NOTE- *Wake turbulence procedures specify increased separation minima required for certain classes of aircraft because of the possible effects of wake turbulence.*	No Change
a. Broadband Radar System or ASR-9/Full Digital Terminal Radar System:	**a.** Broadband Radar System or Full Digital Terminal Radar System:
Add	*NOTE-* **1.** *Includes single sensor long range radar mode.*
1. When less than 40 miles from the antenna- *3 miles.*	**2.** *When less than 40 miles from the antenna- 3 miles.*
2. When 40 miles or more from the antenna- *5 miles.*	**3.** *When 40 miles or more from the antenna- 5 miles.*
EN ROUTE	*EN ROUTE*
b. Stage A/DARC and EARTS Mosaic Mode:	**b.** Stage A/DARC, M-EARTS Mosaic Mode, **Terminal Mosaic Mode**:

NOTE-
Mosaic Mode combines radar input from 3 to 15 sites into a single picture utilizing a mosaic grid composed of radar sort boxes.

1. Below FL 600- *5 miles.*

2. At or above FL 600- *10 miles.*

3. Within 40 miles of the antenna and below FL 180. Facility directives may specify 3 miles.

Add

Add

Add

Add

Add

NOTE-
Where a significant operational advantage is obtained by modifying a radar site adaptation to single site coverage, facility directives are required to define the areas where 3-mile separation applies.

REFERENCE-
FAAO 7210.3, Single Site Coverage Stage A Operations, Para 8-2-1.

Add

4(a) through **4(d)**

c. EARTS Sensor Mode:

NOTE-
1. *Sensor Mode displays information from the radar input of a single site.*

2. *Procedures to convert EARTS Mosaic Mode to EARTS Sensor Mode at each PVD/MDM will be established by facility directive.*

c1 through **e3**

f. *TERMINAL.* 2.5 nautical miles (NM) separation is authorized between aircraft established on the final approach course within 10 NM of the landing runway when:

1. The leading aircraft's weight class is the same or less than the trailing aircraft;

2. Heavy aircraft and the Boeing 757 are permitted to participate in the separation reduction as the trailing aircraft only;

NOTE-
*Mosaic Mode combines radar input from **2 to 16** sites into a single picture utilizing a mosaic grid composed of radar sort boxes.*

No Change

No Change

3. For areas meeting all of the following conditions:

(a) Radar site adaptation is set to single sensor.

(b) Significant operational advantages can be obtained.

(c) Within 40 miles of the antenna.

(d) Below FL 180.

(e) Facility directives specifically define the area where the separation can be applied. Facility directives may specify 3 miles.

Delete

REFERENCE-
FAAO 7210.3, Single Site Coverage Stage A Operations, Para 8-2-1.

FAAO 7210.3, Single Site Coverage ATTS Operations, Para 11-8-15.

No Change

c. **M-**EARTS Sensor Mode:

No Change

*2. Procedures to convert **M-**EARTS Mosaic Mode to **M-**EARTS Sensor Mode at each PVD/MDM will be established by facility directive.*

No Change

f. *TERMINAL.* 2.5 nautical miles (NM) separation is authorized between aircraft established on the final approach course within 10 NM of the landing runway when **operating in single sensor slant range mode and aircraft remains within 40 miles of the antenna and**:

No Change

No Change

3. An average runway occupancy time of 50 seconds or less is documented;	No Change
4. DBRITE/BRITE/TCDD/TDW displays are operational and used for quick glance references;	**4. CTRD's** are operational and used for quick glance references;

4. OPERATIONAL IMPACT: None.

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1. PARAGRAPH NUMBER AND TITLE: 5-5-3. TARGET RESOLUTION

2. BACKGROUND: Due to the advent of new terminal automation systems, such as Standard Terminal Automation Replacement System (STARS) and ARTS Color Display (ACD), new procedures are required.

3. CHANGE:

OLD	NEW
Add	**5-5-3. TARGET RESOLUTION**
Add	**a. A process to ensure that correlated radar targets or digitized targets do not touch.**
Add	**b. Mandatory traffic advisories and safety alerts shall be issued when this procedure is used.**
Add	***NOTE-*** ***This procedure shall not be provided utilizing mosaic radar systems.***
Add	**c. Target resolution shall be applied as follows:**
Add	**1. Between the edges of two primary targets or the edges of primary digitized targets.**
Add	**2. Between the end of the beacon control slash and the edge of a primary target or primary digitized target.**
Add	**3. Between the ends of two beacon control slashes.**

4. OPERATIONAL IMPACT: None.

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1. PARAGRAPH NUMBER AND TITLE: 7-2-1. VISUAL SEPARATION

2. BACKGROUND: It was determined that paragraph 7-2-1(a) created a misunderstanding of whether visual separation could be applied in Class A airspace.

3. CHANGE:

OLD	NEW
7-2-1. VISUAL SEPARATION	**7-2-1. VISUAL SEPARATION**
Title through ***REFERENCE-***	No Change
a. *TERMINAL.* Visual separation may be applied between aircraft under the control of the same facility within the terminal area, provided:	**a.** *TERMINAL.* Visual separation may be applied between aircraft under the control of the same facility within the terminal area **up to but not including FL 180**, provided:

4. OPERATIONAL IMPACT: None.

1. PARAGRAPH NUMBER AND TITLE: 7-4-3. CLEARANCE FOR VISUAL APPROACH

2. BACKGROUND: Pilots landing at a nontowered airport that has an Automated Weather Observing System (AWOS) or an Automated Surface Observing System (ASOS) should monitor the ASOS/AWOS broadcast to ascertain the current weather and advise the controller that they have the weather.

3. CHANGE:

OLD	NEW
7-4-3. CLEARANCE FOR VISUAL APPROACH	**7-4-3. CLEARANCE FOR VISUAL APPROACH**
Title through **a2**	No Change
b. Resolve potential conflicts with all other aircraft, advise an overtaking aircraft of the distance to the preceding aircraft and speed difference, and ensure that weather conditions at the airport are VFR or that the pilot has been informed that weather is not available for the destination airport. Advise the pilot of the frequency to receive weather information where AWOS/ASOS is available.	**b.** Resolve potential conflicts with all other aircraft, advise an overtaking aircraft of the distance to the preceding aircraft and speed difference, and ensure that weather conditions at the airport are VFR or that the pilot has been informed that weather is not available for the destination airport. **Upon pilot request, a**dvise the pilot of the frequency to receive weather information where AWOS/ASOS is available.
PHRASEOLOGY- *(Ident) (instructions) CLEARED VISUAL APPROACH RUNWAY (number);* *or* *(ident) (instructions) CLEARED VISUAL APPROACH TO (airport name)* *(and if appropriate)* *WEATHER NOT AVAILABLE OR AWOS/ASOS WEATHER AVAILABLE ON FREQUENCY (freq) MHZ.*	***PHRASEOLOGY-*** *(Ident) (instructions) CLEARED VISUAL APPROACH RUNWAY (number);* *or* *(ident) (instructions) CLEARED VISUAL APPROACH TO (airport name)* *(and if appropriate)* *WEATHER NOT AVAILABLE OR VERIFY THAT YOU HAVE THE (airport) WEATHER.*

4. OPERATIONAL IMPACT: Minimal.

1. PARAGRAPH NUMBER AND TITLE: 8-5-4. SAME DIRECTION;
FIGURE 8-5-3, TRANSITIONING FROM OFFSHORE TO OCEANIC AIRSPACE; SAME DIRECTION

2. BACKGROUND: Figure 8-5-3 provides a graphic for the separation rule described in paragraph 8-5-4. The current graphic is incorrect and needs to be amended to properly reflect the separation minima allowed. Specifically:

a. Paragraph 8-5-4, subparagraph b, states that a minimum of 5 minutes is maintained between the preceding aircraft and the following aircraft. However, the graphic shows decimal 5, i.e. a half minute.

b. Paragraph 8-5-4, subparagraph c, states the following aircraft is separated by not more than 4,000 feet from the preceding aircraft. The graphic shows a distance of 5,000 feet between aircraft.

3. CHANGE:

OLD

Transitioning From Offshore to Oceanic Airspace
Same Direction

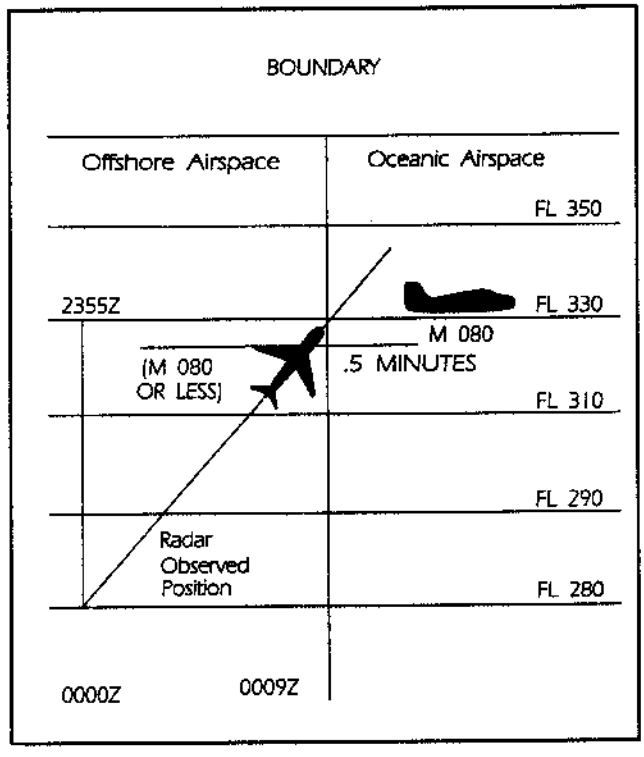

FIG 8-5-3

NEW

Transitioning From Offshore to Oceanic Airspace
Same Direction

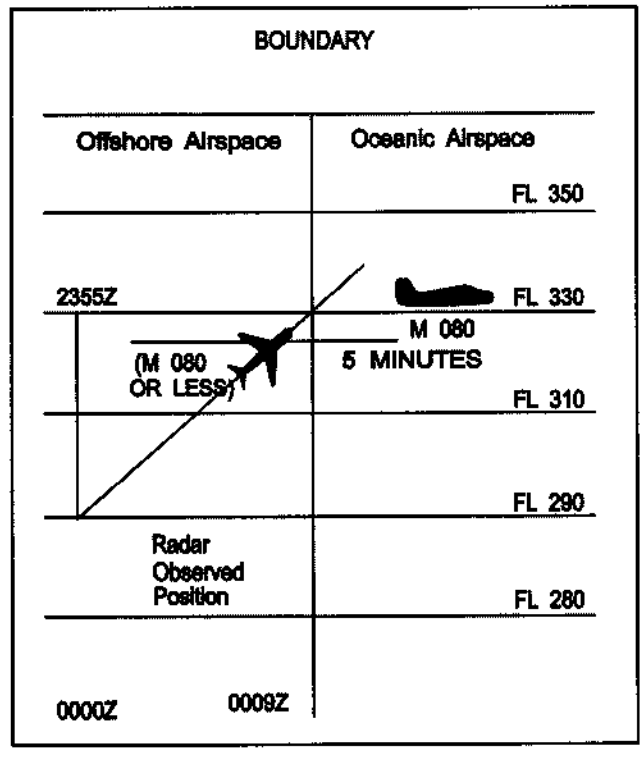

FIG 8-5-3

4. OPERATIONAL IMPACT: This change will correct an error presently in FAAO 7110.65.

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1. PARAGRAPH NUMBER AND TITLE: 9-4-2. SEPARATION MINIMA

2. BACKGROUND: This incorporates GENOT N7110.224.

3. CHANGE:

OLD	NEW
9-4-2. SEPARATION MINIMA	**9-4-2. SEPARATION MINIMA**
Title through **a** ***REFERENCE***	No Change
b. Provide radar separation of 3 miles (En route Stage A/DARC, or FL 600 and above - 6 miles) from the special use airspace peripheral boundary.	**b.** Provide radar separation of 3 miles (En route Stage A/DARC, FL 600 and above - 6 miles) from the special use airspace peripheral boundary.

4. OPERATIONAL IMPACT: None.

1. PARAGRAPH NUMBER AND TITLE: 9-4-3. VFR-ON-TOP

2. BACKGROUND: Paragraph 7-1-1, Class A Airspace Restrictions, of the 7110.65 prohibits issuing a VFR-on-top clearance in Class A Airspace.

3. CHANGE:

OLD	NEW
9-4-3. VFR-ON-TOP	**9-4-3. VFR-ON-TOP**
If the aircraft's route, track, or altitude may cause it to enter an active Prohibited/Restricted/Warning Area, MOA, or ATCAA:	No Change
a. Inform the pilot to conduct flight "VFR-on-top" at least 500 feet (FL 290 and above- 1,000 feet) above the upper limit or below the lower limit of the airspace (subject to para 7-3-1, VFR-on-top); or	**a.** Inform the pilot to conduct flight "VFR-on-top" at least 500 feet above the upper limit or lower limit of the airspace (subject to para 7-3-1, VFR-on-top); or
PHRASEOLOGY- *MAINTAIN VFR-ON-TOP AT LEAST 500 FEET (FL 290 and above- 1,000 feet) ABOVE/BELOW (upper/lower limit of airspace) ACROSS (name or number of airspace) BETWEEN (fix) AND (fix);* *and if the airspace is an ATCAA,* *(name of ATCAA) IS ATC ASSIGNED AIRSPACE.*	***PHRASEOLOGY-*** *MAINTAIN VFR-ON-TOP AT LEAST 500 FEET ABOVE/BELOW (upper/lower limit of airspace) ACROSS (name or number of airspace) BETWEEN (fix) AND (fix);* *and if the airspace is an ATCAA,* *(name of ATCAA) IS ATC ASSIGNED AIRSPACE.*
Add	***REFERENCE-*** ***FAAO 7110.65, Class A Airspace Restrictions, Para 7-1-1.***

4. OPERATIONAL IMPACT: None.

1. PARAGRAPH NUMBER AND TITLE: APPENDIX B, AIRCRAFT INFORMATION HELICOPTERS/ ROTORCRAFTS

2. BACKGROUND: The H46, H64, and H60 have certificated takeoff weights between 12,500 and 41,000 lbs, which place these helicopters in the S+ weight class.

3. CHANGE:

OLD

BOEING VERTOL COMPANY (USA)

(Also BOEING HELICOPTERS, KAWASAKI, MERIDIONALI, VERTOL)

Model	Type Designator	Description	Performance Information		
		Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.
Sea Knight 107, CH-113, Labrador	H46	2T/L	2,130	2,130	I

NEW

BOEING VERTOL COMPANY (USA)

(Also BOEING HELICOPTERS, KAWASAKI, MERIDIONALI, VERTOL)

Model	Type Designator	Description	Performance Information		
		Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.
Sea Knight 107, CH-113, Labrador	H46	2T/S+	2,130	2,130	I

OLD

KAWASAKI HEAVY INDUSTRIES LTD. (Japan)

(Also BOEING VERTOL, VERTOL)

Model	Type Designator	Description	Performance Information		
		Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.
KV-107/II, Sea Knight, Labrador, Voyaguer, CH-113	H46	2T/L	1,500	1,500	I

NEW

KAWASAKI HEAVY INDUSTRIES LTD. (Japan)

(Also BOEING VERTOL, VERTOL)

Model	Type Designator	Description	Performance Information		
		Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.
KV-107/II, Sea Knight, Labrador, Voyaguer, CH-113	H46	2T/S+	1,500	1,500	I

OLD

MCDONNELL-DOUGLAS HELICOPTERS (includes Hughes Helicopters) (USA)

(Also AGUSTA, BREDANARDI, KAWASAKI, KOREAN AIR, NARDI, RACA, SCHWEIZER)

Model	Type Designator	Description	Performance Information		
		Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.
Model 77/Apache, Pethen, Longbow Apache	H64	2T/S	1,500	1,500	I

NEW

MCDONNELL-DOUGLAS HELICOPTERS (includes Hughes Helicopters) (USA)

(Also AGUSTA, BREDANARDI, KAWASAKI, KOREAN AIR, NARDI, RACA, SCHWEIZER)

Model	Type Designator	Description	Performance Information		
		Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.
Model 77/Apache, Pethen, Longbow Apache	H64	2T/S+	1,500	1,500	I

OLD

SIKORSKY AIRCRAFT (USA)

(Also AGUSTA, ASTA, HAWKER DE HAVILLAND, HELIPRO, KOREAN AIR, MITSUBISHI, TUSAS, UNITED CANADA, VAT, WESTLAND)

Model	Type Designator	Description	Performance Information		
		Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.
Blackhawk S-70, WS-70, Seahawk, Pavehawk, Rescuehawk, Thunderhawk, Jayhawk, Oceanhawk, Deserthawk, Yanshuf, LAMPS MK3, Blackhawk	H60	2T/S	2,000	2,000	I

NEW

SIKORSKY AIRCRAFT (USA)

(Also AGUSTA, ASTA, HAWKER DE HAVILLAND, HELIPRO, KOREAN AIR, MITSUBISHI, TUSAS, UNITED CANADA, VAT, WESTLAND)

Model	Type Designator	Description	Performance Information		
		Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.
Blackhawk S-70, WS-70, Seahawk, Pavehawk, Rescuehawk, Thunderhawk, Jayhawk, Oceanhawk, Deserthawk, Yanshuf, LAMPS MK3, Blackhawk	H60	2T/S+	2,000	2,000	I

4. OPERATIONAL IMPACT: None.

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